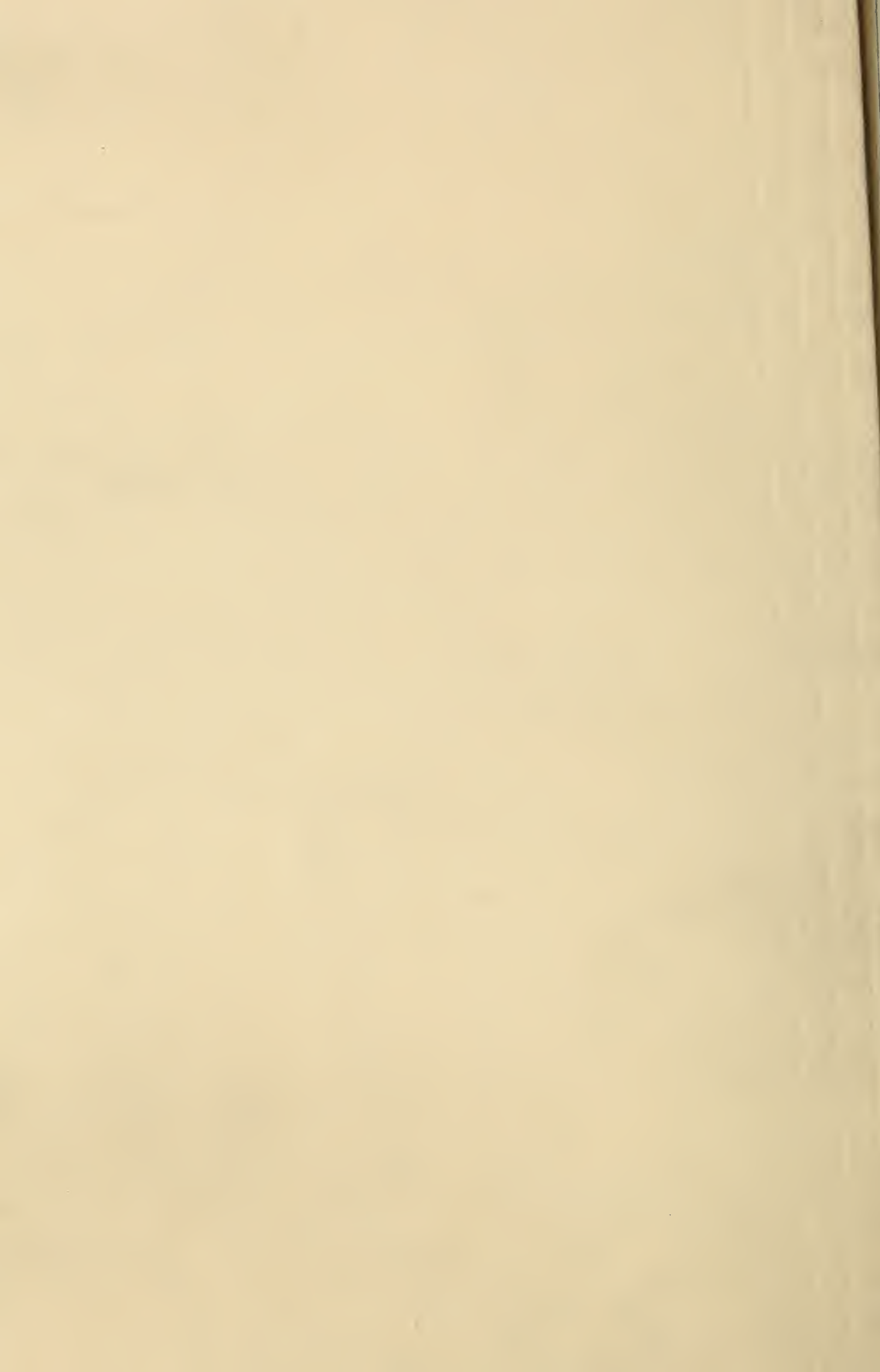


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APR 6 1910

Cleanings in Bee Culture

VOL. XXXVIII

APRIL 1, 1910

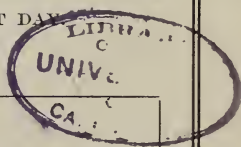
NO. 7



THE RECREATION GROUND OF A BUSINESS MAN OF THE PRESENT DAY

PUBLISHED BY

THE A. I. ROOT COMPANY, MEDINA, OHIO, U. S. A.



COMB HONEY OUTFIT NO. 5.

It is a matter of some difficulty for the average beginner to decide exactly what he requires as an outfit for the first start in bee-keeping. To relieve the beginner of all perplexity we list certain outfits which we think will meet his needs. The one we give below is what may be fairly considered the best. Each item has been very carefully selected, and we doubt the wisdom of leaving any article out; but the purchaser may do so without altering the prices on the other items.

1 A B C and X Y Z of Bee Culture (536 pages)	\$ 1.50
1 copy Facts about Bees (or any other 10c book)	.10
1 year's subscription to "Gleanings in Bee Culture"	1.00
(A large illustrated semi-monthly magazine)	
1 Root smoker	.65
1 pair cotton bee-gloves (small, medium, or large)	.50
1 Bee-veil No. 2, with silk front	.60
1 full colony Italian bees in Danzenbaker Hive	11.00
(Complete with 32 section honey-boxes)	
1 tested Italian queen	2.50
2 Danzenbaker hives complete for comb honey	6.80
(Nailed and painted, ready for the bees)	
1 Porter bee-escape and board	.35
(for taking honey from the bees)	

Special Offer { Delivered at any express office in U. S., North of Alabama and East of Mississippi River. for \$25.00

Some may regard this as too expensive an outfit; but it should be remembered that the colony of bees is just about perfect. The combs, for example, are beautifully straight and nearly full of brood. The breeding of the queen is of the very best, so that one has the nucleus of a fine stock of bees. In many cases a return of \$10.00 in honey has been secured the first year from just such an outfit as this, and in addition one swarm and possibly two may be secured, which practically doubles the value of the investment. This is not an uncommon occurrence. On the contrary, scores of men have done as well or better, where the conditions were at all favorable. Providing any one has a liking for bees, we would earnestly urge the propriety of securing one of these outfits early in the season. One is never too old to learn bee-keeping, and there is no more delightful out-door vocation. It is just right for busy folks who must have a hobby. In fact, there can be nothing better. If this offer is not quite to your liking, write us. We answer questions. To show we are not exaggerating the profits of bee-keeping when conditions are favorable, we insert the following unsolicited testimonial from a man of unquestioned integrity. We could secure many more like this if we chose to ask for them. See statements on reverse.

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A. I.
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Order Coupon

Enclosed find \$25. for which send me your Outfit No. 5 complete, delivered at any express office (if North of Ala. and East of Mississippi River.

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ST. PETER'S LUTHERAN CHURCH, NEW YORK, March 11, 1908.
The A. I. Root Company, Dear Sirs:—Enclosed please find my check for renewal of my subscription to GLEANINGS for five years. I greatly appreciate GLEANINGS, not only for the good and plain reading matter, but also because it furnishes many kinks, which otherwise one would be unable to find out. These kinks have enabled me in the last three years to sell from ten colonies on the average over \$100.00 per year. I donate the money to my church for charitable purposes, and the members are eager to buy, because they know my honey is absolutely pure.
Yours very truly,
DR. A. B. MOLDENKE.

THE A. I. ROOT CO., Medina, Ohio.
New York City, 603 Evening Post Building; Philadelphia, Pa., 10 Vine St.; Chicago, Ill., 213-231 Institute Place.
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GLEANINGS IN BEE CULTURE

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APRIL 1, 1910

NO. 7

EDITORIAL

By E. R. ROOT.

THE plan suggested by Mr. O. B. Metcalfe, one of the firm of Metcalfe & Parks, extensive honey-producers of New Mexico, for securing a wire to the end of a needle, seems as if it might be a good thing. We shall be glad to get reports from others who may be in position to try it.

ATTENTION, OHIO BEE-KEEPERS!

OHIO bee-keepers, if they have not already done so, should write at once to their Senators and Representatives, urging them to support the Patterson foul-brood bill recently introduced in the Senate. There is every thing to show that the bill will pass both houses, and receive the signature of the Governor, *providing* Senators and Representatives are urged to vote for it by one or more of their constituents. It is up to you Ohio bee-keepers to write at once if you have not already done it. The full text of the proposed law was given on page 171 of our last issue.

SPRAYING, AND THE RELATION OF BEES TO FRUIT.

By the time this journal reaches our readers, spraying will be in progress. In most States there are no laws against spraying at any time; but in the majority of cases, progressive fruit-growers do not spray until before and after blossoming time. They know that spraying destroys many of the delicate parts necessary to get good fruit, and that the time to do the work is before the blossoms come out and about a week after the petals—that is, the white bloom—have fallen off.

Of course, the mixtures of lime and sulphur washes and the oil emulsions to destroy the San Jose scale can not harm bees. It is the arsenites designed to kill the codling moth that do the mischief. Metcalfe & Parks, of Mesilla Park, New Mexico, lost last year very heavily because the fruit-growers in their vicinity insisted on spraying their trees when in bloom. All who are situated as Metcalfe & Parks are should begin a campaign of education. Secure bulletins from the experiment stations, mark them, and turn them over to the fruit-growers. F. A. Waugh, one of the best authorities on fruit culture in this country, and

author of a number of excellent books on fruit culture, advises against spraying while trees are in bloom. See what Mr. Waugh has to say in next issue.

Nature has designed that bees shall perform a very important work in pollinating fruit-trees. That, of course, means more and better fruit. Many varieties of fruit are sterile to their own pollen. This is especially true of some apples, pears, and plums. The wind, as the article in this issue shows, will carry the pollen but a short distance. Therefore it seems that nature designs that insects (and that means bees) shall perform the important work of cross-fertilization. Darwin, Fletcher, Waite, and others have shown conclusively that nature seems to abhor self-fertilization, and seeks the pollen of *other* trees and plants. This explains why many fruit-growers are asking bee-keepers to put colonies of bees in their orchards. They know that the presence of bees helps to secure more and better fruit.

WINTERING AS REPORTED FROM DIFFERENT PARTS OF THE COUNTRY.

THE reports are very conflicting, sometimes even from the same locality. For instance, one of our correspondents from Nebraska reports heavy losses everywhere, while another one there says the bees never wintered better. As nearly as we can gather, winter losses are confined *mainly* to localities such as are found in Southern Ohio, Northern Tennessee, Southern Illinois, and along about that latitude. Further north, where the bees are mostly in double-walled hives, and were fed in the fall, there appears to be comparatively good wintering. In nearly all the cases of cellar wintering reports are favorable. In most of the Northern States where it has been very cold, and there has been a large amount of snow, the wintering has been good providing that bees have been well housed in double-walled hives well packed. In nearly all cases where they have been left in single-walled hives with honey-dew stores, the losses have been very heavy. In what is ordinarily understood as the Southern States, presumably the wintering has been good. The only danger in that part of the country is starvation.

LOCATING AN APIARY.

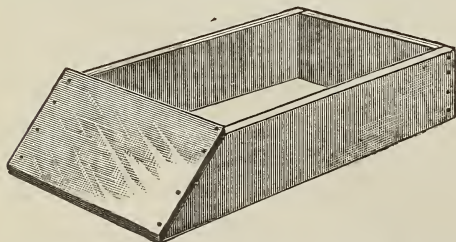
ABOUT the time this issue reaches many of our subscribers some of them will be locat-

ing their yards. A few suggestions at this time may not come amiss.

First and very important, do not put an apiary near a line fence, especially if that fence is or will be next to a cultivated field. It will be well for the bee-keeper to locate his bees as remotely as possible from his own cultivated fields; and if he owns a town lot he should put them clear at the back end of it, as far away from the highway as possible.

Generally speaking, hives should face the south; but there are times when it may be necessary to have the entrances face in different directions to avoid confusion on the part of the bees, especially if the hives are arranged on the group plan. For instance, we consider it poor policy to place four or five hives in a row, facing in the same direction. There is almost sure to be confusion, loss of queens, and danger of strong colonies drawing from the weaker ones. One can locate three hives in a group, all facing the same way; but we would not go beyond that number. If there are five hives in a group we advise the arrangement shown in the diagram below, the dot indicating the entrance. The three hives should face the south, and the other two east and west. We would advise having the groups irregular as to size. In one place we would put two hives, in another three, and in another five. Then we would go further and pick out distinguishing objects such as a clump of bushes, a little tree, or something of the sort that would differentiate one group from another. We regard it as very important to place the hives so that each entrance will have an individuality of its own. This is quite important when young bees and the young queen come out for the first time.

As we go over the country we find a good many bee-keepers locate their hives directly on the ground. Such a policy is destructive to the hive-bottom, and the hive is too low down to work over to advantage. We do not know of anything better than a hive-stand made of rough lumber on the plan shown in the accompanying illustration. If



you do not wish to buy them of the dealer, go to your planing-mill and get the cheapest and poorest stuff you can find that will hold a nail. The front board should slope from the ground to the entrance. This is very important in the spring and fall of the year, and during the height of the honey-flow. While the lumber for this hive-stand is cheap, if properly nailed it will hold the hive proper off the ground for ten or even twenty

years. The bottom edges may rot, but the rotting will take place so slowly that it is inappreciable.

If the hives are arranged in groups, this bottom-board is rather expensive. In that case one could make an oblong frame, place the hive crosswise on it, then lean a board from the ground up to each entrance. Do not forget to give the bees a runway, for this will be found to be worth its cost.

The question now arises, "Shall we have shade?" This depends on locality. In hot climates shade is indispensable. The Arizona plan of shade running east and west is probably as good as any. In the north-temperate climates a little shade is an advantage; but too much is a detriment. Small shrubbery is about right. The shade of *old* apple-trees is a little too dense, while that of young trees, say four or five years old, is about right.

In some places shade-boards made of rough-sawn thin lumber projecting front and rear as well as on the sides of the hives would have to be used, possibly, during the hottest part of the season; but during very windy weather a 15-lb. stone or some other sort of weight is required to hold them on. For this reason we would prefer natural shade.

OUTDOOR WINTERING EXPERIMENTS AT MEDINA; GOOD RESULTS FROM THICK SYRUP FED LATE.

It will be remembered that last fall we packed our outdoor-wintered colonies in different ways. Some colonies had a large excess of honey-dew; others, honey-dew with syrup on top, and still others almost entirely sugar stores. Some of the colonies were fed early in the fall with a moderately thick syrup; others were fed very late with a very thick syrup, or as thick as the bees could take it.

Most colonies were under sealed covers, while some few were under absorbing cushions. The great majority were packed in double-walled chaff hives, and a few in single-walled hives were wrapped in paper winter cases and a few in wooden winter cases; other colonies on the weak order were put in the cellar in single-walled hives. For the total aggregate the percentage of loss was very light, not exceeding 3 per cent.

It will be remembered that last fall we had fears that the large amount of honey-dew that had been gathered all over the country would result in heavy winter mortality. While some reports show heavy losses, yet those losses have not been nearly as heavy as we expected.

At our south yard, where there was much honey-dew gathered, we expected the mortality to be heaviest, and it was. Five colonies died outright out of 75, and perhaps three dozen more were weak. Out of this number quite a few seemed to have dysentery rather badly. As nearly as we could ascertain, this dysentery was much more pronounced on honey-dew stores. Where a colony had been fed largely on sugar syrup,

even though fed late it came out in comparatively good condition, with very little loss.

At the Clark yard, where no honey-dew was gathered, and the bees were fed on very thick sugar syrup, there was no loss except two colonies that were very strong, and they starved. We had underestimated their strength, and consequently did not provide the necessary stores. All the other colonies of that yard came through sweet and clean. Their stores were made up of basswood and clover honey topped off with a little feeding of thick sugar syrup, along the last of November. It turned cold soon after, so that the bees could not cap these stores; and yet in spite of this the results were as above stated.

At the home yard of about 300 colonies, indoors and out, there were only two colonies that died, and that was through starvation. This was not because there were no stores in the hives, but because the clusters had moved over to one side; and on account of the long continued cold they used up all the stores on that side, and, apparently, not being able to get over to the other side of the hive, where there were stores, they starved. For the purpose of experiment some two and three frame nuclei were wintered outdoors under sealed covers. They all wintered well.

The bees at both the Home and Clark yards were in good condition — in fact, they were practically of the same stock. All the nervous and irritable bees, and all the off stock, were put into the south yard; and these odds and ends, so to speak, together with the poor quality of the stores, doubtless contributed to the comparatively poor wintering at that yard.

Bees at the north yard gathered considerable honey-dew. This was the yard where there were over 2000 queens reared last season. All the colonies were drawn on heavily for brood and bees. But the bees here wintered better than they did at the south yard, although they were not in as good condition as the bees in the two other yards. The heavy drain of queen-rearing, and scarcity of stores, doubtless accounted for this.

SEALED COVERS VS. ABSORBENTS.

There was very little difference to be noticed between colonies packed under sealed covers and those under absorbents. The difference, if any, Mr. Bain says, was in favor of the first mentioned. When it is remembered that we have tried these two forms of wintering side by side for a series of years, with the odds nearly always in favor of the sealed covers, the reader can naturally see why we champion that plan — at least for our locality. We have a suspicion that those who so loudly champion the absorbing-cushion plan of wintering may not have tested side by side the sealed-cover and absorbing-cushion plans; for if they were to do so for a series of years they might find the sealed cover simpler to handle, and during some seasons considerably in the lead so far as results are concerned.

PAPER WINTER CASES.

There was comparatively little difference between the paper-winter-case-packed colonies and those in double-walled chaff-packed hives. The difference, if any, however, was in favor of the latter. The greater the thickness of walls, and the better the packing material, the better the results. If the walls are very thick it renders the hive too expensive, and the difference in cost is not offset by the slight gain in the saving of bee life.

RECAPITULATION; THICK VS. A THIN SYRUP AND FEEDING LATE.

As the result of our experiments indoors and outdoors during this past severe winter, honey-dew stores have sustained their reputation to a great extent for being an inferior food for wintering, although the results are not as disastrous as might have been expected, judging from previous years.

Sugar syrup fed thick, even though late in the season, has again demonstrated its ability to bring bees through safely to spring. It is clearly proven that a thick sugar syrup is better than a thin one for winter feeding, and we are inclined to the opinion that late feeding of a thick syrup is not detrimental, as has been supposed, but even has its advantages. Slow feeding in the fall, with a thin syrup, exhausts the vitality of the bees, because they must drive out the excess of water, and this seems a severe drain on them at a time of year when their strength should be conserved. By giving the thick syrup, two and a half to one, comparatively late in the season, the bees are given the very best feed, even though they will not be able to invert it or cap it over. Feeding a large amount of thick syrup practically in one dose does not exhaust the vitality of a colony nor unduly excite it like repeated doses of thin syrup extended over a period of two or three weeks. While we advocate feeding early enough so that the bees can cap the stores, our experience seems to show that this is not essential. At one yard where our bees wintered so well it was so cold when we fed late last fall that the syrup was given hot. There were no fly days after that, and it stayed continuously cold until the fore part of March.

SIZE OF ENTRANCES.

Still another fact that was somewhat surprising was that those colonies having a wide-open entrance, one inch deep by the width of the hive, seemed to winter as well as those having a contracted entrance $\frac{1}{4}$ deep by 8 inches. Our Mr. Bain, however, suggests that the snows were so deep all last winter that the entrance of all colonies, large and small, were closed from chilling drafts of air. During open winter we have found that wide-open entrances were too much of a good thing, and have, consequently, advised a limited contraction.

It seems to be proven again that, for our locality at least, sealed covers have the preference, as they make less trouble, and the bees under them winter perfectly. More we could not ask.

STRAY STRAWS

BY DR. C. C. MILLER

WHY NOT make of cement those hive-stands of F. Greiner, p. 149?

MRS. J. W. BACON's plan, page 183, of running up to 12 or more brood-frames and then reducing to 8 when putting on supers, is excellent practice. We do it here by using two eight-frame bodies.

J. E. CRANE, you're naughty to try to drive me out of bee-keeping, page 173, by saying I must locate bees where stones are not needed to keep covers from blowing off. No such location here. But with flat covers I never use stones except sometimes early when covers have been cracked open and it is too cold for glue to stick them on again.

NEVER BEFORE did I know a winter here when grass stayed green all the time from fall till growth started in spring. Clover shows up fine. But will it honey? as the Germans say. [Clover is fine here, and reports are favorable wherever it usually grows. Will it "honey"? We never knew of a year when it did not "honey" after a heavy snow.—ED.]

J. L. BYER, you ask me to mete out justice in that case, p. 192. The editor prefers that the subject shall "requiescat in pace;" but you come to the next Chicago convention and meet me at meat between sessions, and I'll mete out all the justice you want. It is just as easily settled as were lots of cases where two men had herds of cattle on the same wild land; and please remember that at present, so far as bees are concerned, all land is wild land.

MR. SIMMINS is a man for whose word I have great respect; but I am just a bit skeptical as to meal-feeding being as bad as he paints it, p. 178. I have fed many bushels of ground corn and oats in spring, and never knew any bad results from it. Still, there is the possibility that I am, as he says, "not too observant." [This is a problem that will vary somewhat according to locality. There is danger of coaxing the bees out too early. Nature does not usually furnish natural pollen before the bees ought to have it. Man very often tampers with nature, disarranging her plans, with the result that trouble follows. Notwithstanding, we think there are times when bees may and should be given artificial pollen. As many noted last spring, considerable brood died because of improperly balanced ration—that is, a lack of the nitrogenous element in their food. Of course we have no positive evidence that the brood died from this cause; but the circumstantial evidence was very strong.—ED.]

VIRGIL WEAVER, much obliged for promise, p. 197, of a crop this year; but how am I to tell whether winter has nothing to do with it? The winter of 1908 was open; and although plants could be seen quite early, their roots must have been hurt, for later on they

disappeared and few plants were to be seen, to say nothing of blossoms, so of course there could be no honey crop in 1909, and it *looks* as if winter had killed the plants. The winter of 1909 had such a snow-blanket as I never knew before; plants look superb; and if there's a bumper crop one can hardly blame that snow-blanket for putting in a bill of charges for winter protection. [Mr. Weaver has fairly earned a reputation for being a good prophet. His predictions for the last three or four years have come very near being true. He may be mistaken in some of his conclusions, but in the main he seems to have discovered some conditions that are favorable and unfavorable to a clover yield.—ED.]

CAN IT BE that locality makes a big difference about the kind of day when bees should be taken out of the cellar? In this locality a warm sunny day is always chosen for taking out bees; and the ill results mentioned, p. 195, do not follow. The entrances are immediately closed up to a square inch or less, and that probably makes a difference about drifting. If a colony is *quietly* placed upon its stand when warm enough to fly, why should it fly out any differently from what it would if it had been on its stand for a week? An important item is that the cellar must be wide open all night before taking out. If I should take them out on a cold cloudy day there might come severe cold for a week or more, when they would be very much better off in the cellar.

P. S.—Since writing the above I have read R. F. Holtermann's "drifting" article, page 196. He thinks the principal cause is "excitement on the part of the bees so that they do not mark their location as they leave the hive," and he also thinks "the rapid changes of conditions from inside atmosphere to the outside increase the excitement of the first fly." You will see that I provide for both these contingences. By having the cellar wide open the previous night there is little change upon going to the outside atmosphere, and I think the contracted entrance does much to make them mark their location. [It may be that giving bees fresh air the night before taking them out of the cellar may to a great extent overcome the excitement that would take place under other conditions when set out. In our locality we can be reasonably sure of favorable weather on a day following. The United States weather reports are fairly reliable. Let us suppose that to-day it is a little too cool for the bees to fly. The weather report shows that it will be warm and balmy tomorrow, with probably a clear sky, which means sunshine, of course. We set the bees out toward night. It is a little cool during the night; and as the cluster gradually unfolds the next morning the bees find their way to the entrance; and when the temperature is right they will come out gradually—not with a pellmell rush. As the hives are all out, we avoid some of that "drifting" of which we have been reading, and ere long the bees quiet down to normal.—ED.]

BEE-KEEPING AMONG THE ROCKIES.

BY WESLEY FOSTER, BOULDER, COL.

WINTER VENTILATION.

If bees have a large winter entrance they are more apt to come through in better shape than if the entrance were contracted. If mice are troublesome they may be kept out of the hives by using wire screen three mesh to the inch over the entrance. The value of abundant ventilation during the winter is better known now among western bee-keepers than a few years ago. The contraction of the entrance is still thought to be essential by many; but some of the most successful ones have had some experiences that point the other way.



THE SNOW ON THE RANGE AND ITS EFFECT ON THE WATER SUPPLY.

Government reports from the mountains show that the fall of snow so far is below the average, and that there will be less water for irrigation than last year unless a great deal falls from now on. The warm days in the winter, which aid in settling and packing the snow into ice sheets on the high levels of the ranges, have been numerous this winter—at least they came at times when there was snow to be settled and packed. The report says there is considerable soft snow in the timber on the lower levels and foot hills. This condition of snowfall is general throughout the mountains of Colorado.



SHIPPING COMB HONEY; FREIGHT CLASSIFICATIONS, ETC.

A shipment of comb honey was recently made from a distance of several hundred miles into Denver. The shipper did not know that the glass fronts should be protected with wood strips so the shipment would take the lowest possible freight rate, which is the first-class rate in less than carload lots. The first-class rate is \$1.70 between this point and Denver; and where the glass fronts are not protected the rate is double first class; so it cost this bee-keeper \$3.40 a hundred to ship his honey to market. By tacking a little strip of wood over the glass, 45 cents a case in freight would have been saved.

This ruling of the railroads in regard to comb honey in glass-front cases is unjust I think; for where the glass shows the contents of the case it is much more likely to be carefully handled. A lot of single-tier cases of honey with wood slide in place of glass came through in very bad shape, practically all of it mashed and broken. The freight men thought it was cheese or butter, no doubt.

These instances show that bee-keepers can not be too well posted on freight rates, classifications, and the proper way to ship honey.

If the freight agent in the first case spoken of had been looking out for the best interests of his company's customers he would have told the bee-keeper how to secure the lowest possible rate.



COMB-HONEY CASES WITHOUT GLASS.

This whole question of glass cases or no glass has reference to producing sections of the country and the distant markets. Fruit and honey have met much the same conditions in seeking a market. Twenty years ago the bulk of the fruit crop was produced in the Eastern States, where the most of it found ready sale in nearby markets. The battle for markets was not severe, and extra bids were not made for trade. With the commercial orchards of the West, where markets were two thousand miles distant, the sales demanded the packing of only the choicest sound fruit, for the inferior produce would spoil before the market could be reached. The profitable following of fruit culture at once depended on allowing only the best fruit to mature on the trees so all the crop would be fit to ship. Then when the Western growers found out their only hope was in quality (they could not sell average fruit in competition with Eastern fruit), they had to raise a better article, put it up more attractively, and get a higher price. The covering of the edge of a box of dried peaches with lace paper has added 10 to 15 cts. to the price received.

This is the state of affairs in the honey market. Western honey has to be whiter, and more attractively put up in double-tier shipping-cases, to find a sale in the Eastern markets. But those markets now want the goods the way we put them up, with one fourth of the case exposed to the glass front.

Mr. Scholl objects very much to the Colorado methods of producing honey; but we could not produce comb honey in bulk and ship into Texas to compete with his product. The cost of shipment would prohibit, and then we should have to sell it as cheap as he sells his or not find a market. But we can sell our comb honey right in Mr. Scholl's Texas markets because we are supplying a demand Mr. Scholl does not meet. We cater to a trade Mr. Scholl considers unprofitable. It may be, in comparison with his bulk-honey business, but it is the only way we can dispose of our Colorado crop. I think we get much more per pound than Mr. Scholl, though it costs us much more to produce it.

Cars of comb honey have been shipped out of Colorado by the score at \$3.00 net per case to the producer, and I know of one car that brought \$3.15 per case of 24 sections. For the actual weight of honey in a case, that would be at least 16 cts. per lb.

I do not doubt that Mr. Scholl can make more money with bulk honey in his location and relation to markets; but I think Colorado and other Western bee-keepers do better to produce a white comb or extracted honey.

NOTES FROM CANADA

BY R. F. HOLTERMANN.

WINTER LOSSES.

At this time of writing, March 8, bees in this section of country, if outside, have had a splendid fly. So far as I can judge, bees properly prepared and wintered outside have wintered well. On Saturday, March 5, the weather was so mild the bees were working on hyacinth and other blossoms offered for sale on the Brantford market square.

IS HONEY-DEW AN EXCRETION?

Observations covering many years and sections of the country convince me that honey-dew may be an excretion from plant-lice or that it may be given off by the leaves themselves. It may be possible to prove the above; but I pity any one who attempts to prove that it never is an *excretion*. In my estimation, not much damage can be done to the honey-dew industry. It speaks for itself.

ARTIFICIAL POLLEN.

Jacob Alpaugh recommends peameal or "Brose" as a substitute for pollen, and advises mixing it with chopped oats or bran, feeding it in a sheltered place near the apiary, setting the trays out in the morning, and taking them in or covering them in the evening so the dew will not wet the mixture. He recommends either putting a little honey here and there on the artificial pollen to entice the bees, or putting some on the end of a stick, collect bees on the end of this stick from the entrance of a hive, and then carry the bees to the pollen on the stick, in this way introducing the bees to the pollen.

WHEN THE SWARMING TENDENCY IS GREATEST.

Page 138, March 1, Wesley Foster says: "In this country I know the control of swarming hangs around a few days after the lower hive is well filled before we get the bees fully convinced that supers are the next on the program, and not swarming." The above is a very important point in this country. I consider that, when the time indicated is tided over, there is not much danger from swarming until the supers become crowded. A large entrance and shade are, however, no mean factors in preventing swarming.

KEEPING HONEY FROM GRANULATING.

On page 134, March 1, the editor states, "Apparently, then, a very cold temperature or a very warm temperature is less favorable to granulation than any point between." This is just my experience. To quite an extent the *result* from these two extremes is the same. In the former, granules show no tendency to form (may I so express it?); in the latter the honey is so thick the particles can not move, and the process is retarded. In this latter case, however, I believe a microscopical examination would reveal many fine grains.

The provincial apiarist has sent out the following advice, which will commend itself to bee-keepers generally:

I understand from our inspector's reports that you have had, within recent years, foul brood in your apiary. If this is the case you should be particularly careful to prevent robbing during the warm days between now and summer. All hives where bees have died must be taken indoors, away from all possible robbing. It is not enough to close them, because robbers will often gain an entrance when least expected. All entrances of live colonies should be made quite small, especially where the bees are weak in numbers.

Use every precaution and great watchfulness to prevent robbing. Do not under any circumstances leave combs of honey out for the bees to clean up. Any honey you have is likely to contain germs which would scatter disease in your healthy colonies. On account of prevalence of disease in unexpected places throughout the province it is never wise to feed honey to bees; and where disease is known to exist it is the worst of folly.

I hope you understand fully the symptoms and cure of foul brood. If so, you can be your own doctor, as the inspector's time is fully occupied with those who do not understand the disease. If not, drop me a card, and a bulletin with description, and full instructions will be sent you.

LECTURING IN CANADA.

On page 42 the *British Bee Journal* contains the following:

I am an old English country bee-keeper, and have settled out here in British Columbia. I find the American system of bee-keeping is the only one practiced; and, having learned all there is to be known about it, I keep my opinion that it is not to be compared with our British method of manipulation. We enjoy very long summers here, and the climate is favorable for bees; but there does not seem to be any one except novices in the bee-business, and some have been very successful, so I have no fear of my results. I am an all-Britisher if possible, and shall push the old-country appliances as soon as I can fix up my depot and get a good home firm to represent. By profession I am a watchmaker; but out here things are not so finely defined, and it is not unusual to change one's trade. What books would you recommend to one who intends to make bees a leading line as a lecturer, for instance?

Victoria, B. C.

E. C. APPELEY.

Many English complain that they are not properly treated by Canadians when they come to this country. Let me point out that the above remark indicates clearly a spirit that Canadians say is altogether too prevalent among the English when they come to Canada; and the few or many, as the case may be, who manifest this spirit make the position difficult for those among the English (and I believe of the latter there are many) who have no such exalted view of their own attainments.

As far as the position of lecturer is concerned, there is no such opening in this country; and if there were a lecturer going abroad in such a spirit he would have to become his own employee, advertiser, audience, etc.

I have read the *British Bee Journal* with profit for years, as also German and French journals, and these papers can be read with profit by bee-keepers on this continent; yet what little I know of "the American system of bee-keeping," and particularly in its *apiarian appliances*, has a foremost place with me. I believe we have been ready to embody every good invention, such as the honey-extractor, comb foundation, etc., into our system, and therefore we have never assumed a position of *knowing it all*.

CONVERSATIONS WITH DOOLITTLE

AT BORODINO, NEW YORK.

WHAT CONSTITUTES A GOOD QUEEN?

"I have read your Conversation, October 15, and I want to know how you raise *good* queens so late in the season."

"How do you raise good queens at any time of the year, Mr. Van Deman, or in mid-summer, when a good yield of nectar is on?"

"That is very simple. I let the bees do it."

"Sure. And the bees do it in the fall. It is just as simple the first half of September, with feed and a little manipulation, as it is the first half of June, in this locality. In fact, the conditions during the former are equally propitious with the latter, for the first half of June gives us a dearth of nectar and more fluctuating weather than does September. But in either case, by feeding and stirring the bees up they are brought into as nearly the same condition at these times as are your bees in mid-summer when you just let the bees raise the queens themselves. In June the bees are more active than they are in September, when, as a rule, the excitement brought about by feeding is all that is necessary to put them in the same condition they are when a good flow of nectar is on. But in September the bees are not so active; and to bring them into the condition to raise good queens, after feeding for two days the queen is taken away from this colony (which should always be the strongest in the apiary), and the next day the bees are caused to fill themselves with honey by drumming on the hive, when four-fifths of them are shaken into an empty hive or box, the sides of which are covered with wire cloth. They are kept in this box from 9 A.M. to 2 P.M. Then all but the sealed brood which the colony contained is taken away, a frame of prepared cell cups given, and the bees returned from the box. During this five hours of being boxed, both the few bees left in the hive, and especially those in the box, come to realize fully that they need a queen, and need it fully as bad as in natural-swarming time, which works them up to as much activity as is possible at any time of the year. This, with the continued feeding, brings out an extra-fine batch of queen-cells from which emerge as fine queens as you ever set eyes on. However, with the exception of early spring and in the fall, our queens are reared in upper stories over a queen-excluder. See 'Scientific Queen-rearing.'"

"Now how about the drones?"

"Near the close of the drone-brood season, all the brood of that persuasion is taken from the three or four colonies having the best drone mothers at their head, and this brood massed in a strong queenless colony which is kept very strong by giving it an upper story, into which frames of emerging brood are inserted as often as is necessary to keep up the required strength. When

our September-reared queens are ready to mate this hive is looked over, and all the under-sized drones, and those apparently defective as to wing power, shape, or otherwise not what we would like, are killed off, when this colony is regularly fed between 12 and 1 o'clock each day, which causes an activity of these drones much above normal. In this way we get queens equal to those reared at any time, and, as all other drones, or at least the most of them, are now killed off, we get all of these queens mated to what has been termed 'hand-picked' stock."

"Do you select your breeders from these?"

"Very many of them."

"What constitutes a good breeder?"

"As a rule, we prefer a perfectly developed queen of about medium size. We have found that queens of abnormal size, or those much under size, are not equal to those which are about normal. Aside from size and perfect development, we next ascertain how her eggs are laid. If scattered about in the combs with missing cells here and there, together with some stuck on the sides of the cells, she can not be classed as a good breeder. Now, understand, this is when she has a hive of empty combs before her, as any queen has, as a rule, when she first begins to lay. If there is brood emerging here and there in the hive, any queen will scatter her eggs about among this brood, no matter how good she is. Then when her brood emerges from the cells and gets straightened up, say three days after they begin to emerge, these bees should be of normal size and show the regulation markings, while her queen progeny should be of the kind as to development, size, etc., as was the mother."

"There seems to be no standard as to what constitutes a pure queen of any race."

"I fear you have not read the many good books on bee-keeping. Nearly all of the books like the A B C and X Y Z of Bee Culture, Langstroth, Quinby, etc., treat on these things, and I would refer you to them."

"All right. But what is the size of a colony that can be called strong in the spring, say when the first pollen comes?"

"At a New York State bee-keepers' convention, some 25 years ago, this same question came up, and a committee was appointed to report on it. As my memory serves me, that committee told us that any colony which, on the first of May, in an average season, on a morning so cold that there was a frost, showed a cluster of bees between seven combs, or what is known as a six-space cluster, could be considered a good colony of bees, as such colonies would give better results at the end of the season, other things being equal, than colonies showing either more or fewer spaces occupied. And as I remember it, the sense of that convention was that the five-space cluster was preferred to any colony occupying from eight to ten spaces, or what would be considered an extra-strong colony at that time of the year. Years of experience has told me that the report of that committee was a wise one for a latitude ranging between 40 and 45 north."

GENERAL CORRESPONDENCE

LIQUEFYING CANDIED HONEY ON A LARGE SCALE.

Some Objections to the Solar Method of Treating Honey to Prevent Granulation.

BY O. B. METCALFE.

On p. 769, Dec. 15, Mr. H. R. Boardman describes his method of treating honey to the sun's rays to prevent its granulating. Now that some one else has mentioned it I have noted several times that honey heated by sunlight does not granulate quickly if at all. Season before last we had some 25 cases of honey in quart jars that candied before we could sell it. As an experiment I melted up some five or six cases of it in the sun extractor; and although several jars lay around for months it never candied again. I took notice of this fact, but thought it no doubt due to its getting too hot, for it came out of the sun extractor quite dark, and tasted badly "cooked."

Besides this experience, some five or six 1-lb. jars of candied extracted honey were set out on the sunny side of one of our honey-houses last spring. The sun liquefied the honey, and I remember that it remained so until the time I left home in the fall, but that also seemed to have been heated rather too much. Now I want to know how much the sun heats Mr. Boardman's honey, and how long he exposes it to the sun.

There is, perhaps, no question which more vitally concerns a New Mexico bee-keeper than the granulation of honey, and no place where bee-keepers could better give it the sun treatment if proven effectual.

C. W. Rever, in the same issue, p. 771, expresses his hopes of a fireless heater which will use the sun's heat for melting honey on a large scale. I have given this matter considerable thought, and have used the sun extractor to melt up a great deal of candied honey by emptying it into the trays of the extractors just as though it were cappings; however, I always melt up just some odd batch of honey in this way, such as a tub or small settling-tank full which has candied before it would settle or before we got it drawn off; and I did it with the understanding that it would get too hot and turn too dark to sell as No. 1. In tin cans the result is even worse, for the melted honey can not run down out of the sunlight; but the unmelted chunk settles to the bottom, where it keeps cool longest, while the melted portion, which is already hot enough, is nearest the sun's heat, and gets hotter and hotter.

Heating by fire has the obvious advantage that the heat may be applied to a large bulk for as long a period as it takes to do the work, and at the bottom, where the unmelted chunk rests; or the honey may be stirred to

prevent its getting overheated in one place while unmelted in another.

One other point against melting honey in the sun extractor, which I noted, was that it would not quite *all* melt. A thin scale of sugar, which resembled rock candy, would settle to the bottom of the jar, and remain so, no matter if I left it for several days, while the slumgum in another part of the same sun extractor would register over 212° F. all through the hot part of the day.

Right here I wish to advise any bee-keeper who attempts the melting of a 35,000-lb. car of honey to make extensive preparations first for doing so. A year ago last fall, with my Mexican boy to help, I set about such a task. The first thing I did was to get enough galvanized iron to make a heater which would hold 27 60-lb. cans of honey, and take cordwood in the fire-box; and now as I think over that experience I believe that still better advice to my brother bee-keepers would be, "Don't let as much as a carload of honey candy on your hands unless you mean to bottle it yourself or sell it granulated." A carload of it candied hard is a big, cold, unrelenting mass.

THE CAUSE OF THE FINE SPECKS IN MR. BYER'S HONEY; HOT WAX AND HONEY SHOULD NOT BE STIRRED.

I am wondering if Mr. Byer, p. 779, stirred that honey in the capping melter. Season before last we were so late with our last extracting that the sun extractors would not melt the cappings; so I set to work to handle them by artificial heat. I made a heater which held 400 lbs., and dumped in the cappings as fast as they melted up. That worked well, for the next morning I had a lot of clear but well-cooked honey in the bottom; next a layer of slumgum, and on top a nice cake of yellow wax; but the honey was too dark and the process too slow, so I emptied the heater, fired up again, and filled in the cappings by the tubful; took a garden-hoe, and, standing over the melter, stirred all the time to keep the mass at an even temperature, meanwhile adding more cappings until the melter was full. I turned up the gasoline flames under it, and stirred constantly until the mixture reached about 160°F., then turned out the fires and left it to settle. Next morning I expected, of course, to have a fine cake of wax on top, a layer of slumgum, and in the bottom some good honey; but to my surprise, there was, instead of wax on top, a light sticky spongy substance. I drew off some honey from the bottom; but instead of being clear and nice, as I expected, it was cloudy; and upon close examination it was found to have tiny particles of wax all through it, even at the very bottom of the tank. I said to myself, "Well, I'll have to strain you!" but this I could not do, for it instantly clogged the strainer. Then I heated it so it would run through the strainer all right, and again left it to settle. The next day I found the same proposition. While hot, the wax, of course, went through the strainer, as I had finally seen it was doing the day before. I decided to give it

longer time to settle; but, alas! it never did settle so I could draw off clear honey from the bottom. My conclusion was that, if hot wax and hot honey are well stirred together, and if it is *thick* honey, the tiny globules of wax will not rise before the honey cools; and once it cools they will hardly rise at all; and it may candy before it will settle. It may be that the "veterans" know this; but I did not, and I am now wondering if it does not explain the specks which appeared like grains of pollen on the tops of Mr. Byer's honey-pails.

Mesilla Park, N. M.

[We have seen considerable of Mr. Boardman's honey; and, as we now recall, the color, body, and quality were the equal of any clover extracted we ever saw. Certainly the color could not be in any way considered darkened in the least.

There are a couple of conditions that may be considered as possibly influencing the color of your honey. First, you have a much hotter climate; and the presumption is that the heat inside of your sun extractors is much higher than would be the heat inside of Mr. Boardman's. But the most important factor is that you liquefy honey that has been actually candied solid in the sun extractor, and the long-continued high temperature required to bring it to a liquid condition would necessarily affect its color. Mr. Boardman does not, as we understand it, allow his honey to candy, but treats it *before* it candies, as explained in his article on page 768, Dec. 15, last year. In doing this his honey is not subjected to so long-continued a heat. We would infer, then, that the sun's rays, when applied no more than enough to arrest granulation in liquid honey, would not necessarily affect its color, although there is a bare possibility that alfalfa might be more susceptible to the actinic rays than ordinary clover or basswood. It is true that Mr. Boardman, in his earlier experiments, liquefied granulated honey; but his scheme seems to be confined to *liquid* honey.

It would seem to be very clear from your experience that candied honey can not be as satisfactorily liquefied by sun heat as by artificial. If we remember correctly, Mr. R. C. Aikin, of Loveland, Colorado, experienced somewhat the same difficulty in rendering up combs in his solars. He found that the honey and the wax on the top were overheated, while the slumgum beneath was only partially melted. To overcome this difficulty he applied artificial heat on the under side to the pan of the solar extractor, thus getting heat from above and below. This might eliminate a part of your trouble, although it would be our opinion, if artificial heat is to be used at all, that the increased cost from using the sun's rays would more than offset the slight advantage.

If any other correspondent has had the extensive experience of Mr. Metcalfe in liquefying candied honey by sun heat, we have never heard from him. Certainly his experiment was conducted on a sufficiently large

scale to justify the conclusion that solar heat is not satisfactory for melting up granulated honey.—ED.]

BEES AS ROBBERS OF FLOWERS.

BY JOHN H. LOVELL.

Dr. Miller's wide range of information and genial humor render his page of notes most valuable and entertaining. *Apropos* of his remark on the absence of nectar from roses, while I certainly do not wish to be censorious, for we are all fallible enough, still I think that popular writers on the honey-bee should be more accurate in their statements. For example, a well-known writer of children's stories not long ago told in the *Ladies' Home Journal* of a bee that gathered honey and wax all through the long summer months. With a little effort the proper source of wax might easily have been learned.

Now as to the question, "Why do bees seek to enter the young buds of roses?" Perhaps a brief inquiry as to the behavior of bees (bumble-bees as well as honey-bees) toward flower-buds in general will be helpful.

The fly-honeysuckle, or *Lonicera ciliata*, is a graceful slender shrub which blooms in our rocky northern woodlands during the last weeks of May. The flower-stalk bears at its summit two pendulous, yellowish-green flowers, which are half an inch in length and tubular in form. The nectar is secreted and lodged at the base of this tube, where it can be readily reached by the long tongues of bumble-bees, by which chiefly this species is pollinated, though it is also visited by butterflies. But the female, or queen of *Bombus consimilis*, instead of waiting for the flower to expand often bites a hole through the bud. Sometimes the perforation is near the apex of the bud, but usually it is near the base of the tube, and in one instance I found the corolla nearly circumcised, and held by only a few threads.

Bees also puncture at the apex (usually on the under side) the buds of the common skullcap, or *Scutellaria galericulata*, even when they are quite immature. The flowers are labiate, or lipped, and in two instances I observed a narrow slit on the upper side of the corolla tube, and in a third case the whole upper portion of the tube was cut away, leaving the lips suspended by a mere thread. The buds and hollow tubular nectaries of many other flowers are robbed by bees in the same way. Let us go out into the field and observe how bees puncture the nectaries of two or three different kinds of flowers.

The familiar "touch-me-not" (*Impatiens fulva*) has its brown-spotted orange blossoms shaped like a horn-of-plenty with the spur inflexed or bent inward beneath it. This spur contains the nectar. The flower is suspended horizontally with the anthers and stigma lying upon its upper side, so that, when a bee enters the dilated corolla-sac, its back is dusted with pollen, which it carries away to another flower. While the spurs

may often be found intact, they are frequently punctured by bees. August 10 I examined a large number of flowers, but none of the nectaries were perforated, and they were visited in the legitimate way by *Bombus consimilis*, which made from seven to twelve visits per minute. The thorax of the bee was plentifully covered with pollen. From August 23 to 27 I found hundreds of the flowers perforated, and both bumble-bees and honey-bees stealing the nectar. A honey-bee was watched during 25 successive visits, and in no instance did it make even a pretense of visiting the flower in the normal way; but in every case it swung itself beneath it, got astride the spur, and began sucking the nectar. The number of visits per minute was about ten. Both the honey-bee and *Bombus terricola* were observed in the act of puncturing the nectary. The maxillæ alone were employed, and were moved slowly back and forth for the purpose of piercing the tissue. The perforation is usually 3—4 mm. from the end of the spur, which is 10—11 mm. long. Sometimes there is one, sometimes several openings, or there may be a slit 3 mm. long.

If, after the manner of certain plants famous in myth and story, the *Impatiens* (fifty in this respect called "touch-me-not") could speak, what a protest it would utter! For unknown centuries it has been building up its flower edifices only at last to find its work in danger of being rendered worse than useless by a change in the habits of its bee visitors. It should, however, also be stated that the flowers are frequently visited by humming-birds, and I have also seen another smaller species of bee enter the flower in search of pollen. Small beetles and spiders occasionally seek shelter in the sac, and various flies are attracted to the outside by the bright colors.

The columbines in my garden secrete nectar very plentifully. If a flower of the white variety be held so the light will shine through its translucent tissue, the nectar may be seen filling a tenth of an inch of the hollow spurs or nectaries. Both the purple and white varieties are punctured by bees. Mueller observed a bumble-bee, after licking the calyx in a fruitless endeavor to obtain the honey, bite a hole in the spur; and afterward it punctured the flowers visited, without any preliminary delay. I have observed three distinct incisions, one above the other, on a petal of this plant. The first was over half an inch from the tip of the spur, well up on the expanded part of the tube; the second was much lower down, and the third still nearer the tip. Apparently the upper puncture was too far distant to permit the tongue of the bee reaching the nectar; and to rectify this mistake the other holes were made lower down.

The flowers of the scarlet runner are very attractive to bees. August 14, in my garden the vines were in full bloom and were a blaze of glory. Honey-bees and bumble-bees were constantly coming and going, but not one of them entered the flower in the normal way.

There was a hole on the under side of every nectary; and, what was a little singular, they were all on the left-hand side. The bees went directly to these holes, out of which they easily sucked the nectar. More than 300 species of flowers are known in which bees bite holes, and which they rob of their nectar, and several of these often fail to produce seed. Both the mandibles and maxillæ are used for this purpose—the former for biting, the latter for piercing. If there are two small punctures side by side, they were made by the mandibles; but if a narrow slit, by the maxillæ. A few of the more common forms robbed by bees, besides those already mentioned, are the red clover, locust, *Dicentra corydalis*, dead nettle, larkspur, acornite, and vetch.

We are now in a position to answer Dr. Miller's question. Bees bite holes in many buds because the petals are united by their edges into tubes or bells, and they can not gain access to the interior of the flower in any other way. Their object is to find nectar before the flower opens. But in the rose all the petals are separate and distinct, and essentially alike. There is no occasion to puncture them. The bee gains an entrance to the flower by pushing its way between the petals of the growing bud. It is, no doubt, looking for nectar. Of course it does not then know that roses are nectarless; for if it is early in the season it has never before seen a rose. But bees very quickly learn from experience that the roses contain only pollen, and ever after they remember it. The ability of the bee to learn from experience is well illustrated by their behavior toward buckwheat blossoms, on which they work in the morning but not in the afternoon. So, too, they do not visit the gaudy, nectarless exotics of cultivation, for they have learned from experience that their time would be wasted. The mental attributes of the honey-bee are far too high to permit its flying in a mechanical way indefinitely to a flower from which it gains no advantage.

Waldoboro, Maine.

[The honey-bee is not provided with cutting-jaws like the wasp and beetles. At one time it was supposed that honey-bees could cut through flower-tubes; but some of our best authorities doubt this. The holes found near the nectaries of the flowers could easily be made by other insects provided with cutting-jaws. Unless you actually saw honey-bees do all of the cutting from start to finish on the touch-me-not, we should be inclined to the belief that other insects had already been there before, started the job, or made a minute hole which honey-bees, coming on later, could enlarge. We have proved this was the case when the charge was made that bees punctured grapes. We found that a small bird started the holes, and that, later on, bees came on and made the holes larger. In the case of the touch-me-not, "small beetles," and "spiders," both provided with cutting-jaws, and both of which you found on the flowers that were cut, might be the real culprits.—ED.]

TREATISE ON POLLINATION OF APPLE-BLOSSOMS.

BY C. I. LEWIS AND C. C. VINCENT,
of Oregon Agricultural College Experiment Station,
Corvallis, Oregon.

[We take pleasure in presenting the following article from *Better Fruit*, on the subject of fruit-blossom fertilization, as it is of special interest to the majority of our readers at this time. Being written from the standpoint of the fruit-grower it is, of course, absolutely without prejudice in favor of the bees.—ED.]

It was not until the close of the last decade that the significance of pollination of apple and pear blossoms came into prominence. Through the efforts of M. B. Waite, in the United States Department of Agriculture, intelligent light was thrown upon this important question.


As far back as 1793 the importance of insects in pollination was impressed upon the minds of many investigators; and Mr. Sprengel, a German writer, published a book entitled, "The Secret of Nature in the Form and Fertilization of Flowers Discovered," which proved to be an effective stimulus for future work upon this interesting study. 



PLATE I.—FIRST STEP IN EMASCULATION

While Sprengel's work was practically forgotten, other investigators were making acute observations on the cross-fertilization of flowers, which completely overthrew the theory advanced by Sprengel, of the independent creation of species. Not long after Sprengel's book appeared, Andrew Knight carried on some very interesting experiments on the cross and self fertilization of the pea, and arrived at the conclusion that in no plant does self-fertilization occur for an unlimited number of generations.

But it was not until after the appearance of Darwin's "Origin of Species" that Knight's theory was emphasized as a general law of nature. At this time the real value of Sprengel's work was realized, and his discoveries opened up new paths for investigation, especially along the lines which were to determine the forms of flowers.

In Darwin's "Origin of Species" cross-fertilization was emphasized; but no special significance was attached to this discovery until the appearance of his second work, entitled "Various Contrivances by which British and Foreign Orchids are Fertilized by



PLATE II.—REMOVING THE PETALS

Insects." When summing up his work he states, "Nature abhors perpetual self-fertilization." Not content with these results, he explored new lines of investigation, and from careful observations noted differences in the action of pollen on the same and another flower. Darwin's work, "Variation of Animals and Plants under Domestication," suggests many interesting lines of original research work, and from these suggestions experimenters have branched out into new fields of investigation.

It was largely through the efforts of Darwin that Waite carried out the experiments outlined in his bulletin, "The Pollination of Pear Blossoms." Since then many investigators, such as F. A. Waugh, S. A. Beach, C. P. Close, M. M. Munson, S. W. Fletcher, U. P. Hedrick, and many others from the agricultural colleges in the United States, have worked on pollination problems. Likewise H. Mueller-Turgau, O. Kirchner, and Dr. Ewert, of Europe, have also carried on many investigations and experiments on this subject. The many reports sent into this station from various parts of our State, complaining of the lack of setting of fruit, have led to investigations on this problem by this department, some of which are reported in this bulletin.

METHOD OF EMASCULATION.

Any one contemplating the carrying-on of pollination experiments must have a thorough knowledge of the parts of a flower before a high degree of success can be ob-



PLATE III.—REMOVING THE STAMENS



PLATE IV.—APPLYING POLLEN TO THE PISTILS

tained. Next, it is necessary to learn the operation of emasculating, which consists in removing the anthers from the flower. The object of this process is to prevent self-pollination. To remove these anthers in the best possible way is a serious question with many investigators. At this station the writers have received excellent results by the use of the method outlined below, and have made from six hundred to one thousand emasculations per day. In carrying on work of this nature, rapidity as well as efficiency must be sought.

Method.—Grasp the blossom with the thumb and fore finger of one hand, and grasp the tips of the petals with the thumb and fore finger of the other hand (Plate I.), then, by simply giving the wrist a quick upward or downward movement, the petals can be easily detached from the blossom (Plate II.). Now, with one or two quick movements with the scissors (Plate III.) the anthers are removed and the pistils are ready to receive the pollen (Plate IV.). After the application of pollen is made, the

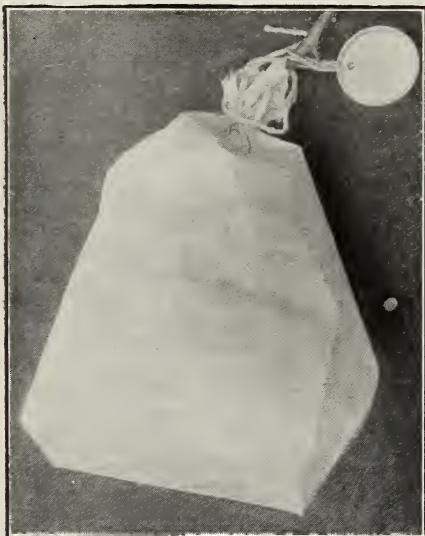


PLATE V.—METHOD OF BAGGING THE BLOSSOM

emasculated blossom is enclosed within a bag (Plate V.) and allowed to remain until fecundation has taken place and all danger from the action of foreign pollen is over. After every pollination, label each bag in such a way that there will be no question as to what variety of pollen is used. As the apples approach maturity it is essential that they be enclosed in cheese-cloth bags. This protects the fruits from being picked accidentally. The object in removing the petals is to tell just where to make the cuts without injuring the other parts of the flower. Since this greatly facilitates the method of emasculating, it may serve as an impetus for greater work along this line.

Several methods of emasculating the blossoms are used by different investigators throughout the United States. Waite, of the



PLATE VI.—FIG. 1. IMPROPER EMASULATION, SEPALs BEING INJURED. FIG. 2. PROPER EMASULATION, SEPALs INTACT

Department of Agriculture, removes the corolla with the aid of a small sharp pair of scissors, leaving the emasculated blossom as seen in Plate VI., Fig. 1. Others have been fairly successful in using a sharp scalpel to perform the work. We have found that in every case when the sepals were removed with the petals it caused a malformation of the apple, as shown in Plate VII., Fig. 1. Fig. 2 shows a normal apple when sepals are unmolested.

It is evident that emasculating must be skillfully done, for the slightest mutilation causes a malformation of the calyx end of the apple. When the sepals were not injured in any way a large per cent of the emasculated blossoms set fruit. Plate VI., Fig. 1, shows the wrong way of emasculating, and Fig. 2 the correct way of emasculating. The method of removing the blossoms as outlined by the writers leaves the sepals in perfect condition, with the fruit unharmed.

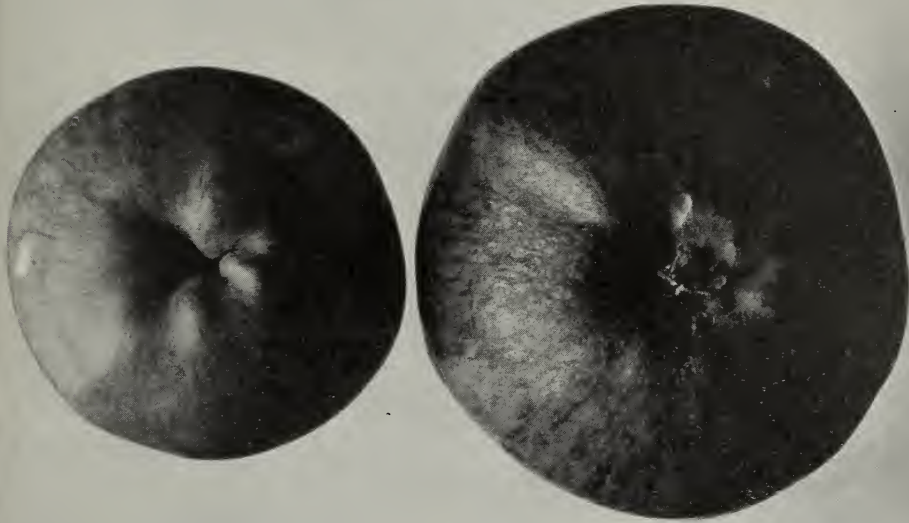


PLATE VII.—FIG. 1. MALFORMATION, CAUSED BY CUTTING SEPALS WHEN EMASCULATING.
FIG. 2. NORMAL APPLE, AS A RESULT OF ALLOWING SEPALS TO REMAIN.

COLLECTING POLLEN.

One of the greatest problems the plant-breeder has to meet is the collecting of an adequate supply of pollen for work on a large scale. It is evident that, where many of our leading varieties blossom together, pollen must be gathered in sufficient quantities beforehand, if extensive experiments in cross-pollination are to be carried on.

Since this is the case, means must be provided by which the blossoms can be forced. To accomplish this, a forcing-house is very desirable, although for work on a small scale any house having quite a few windows on the south side would answer the purpose.

Selecting Twigs.—Small twigs, from ten to twenty inches in length, having from three to six clusters of blossoms, are gathered from the variety which is to be used as a pollenizer, and taken to the forcing-house. First, all the open blossoms are removed from the twigs, which are then placed in jars of water and properly labeled, then covered with hoods so as to prevent the transfer of pollen by insects.

Usually the twigs are placed in the forcing-house a week or two before the trees come into blossom. If the weather is good the blossoms will open in three or four days. If, however, it is desired to obtain quicker results, it can very easily be accomplished by using warm water in place of cold. By split-

ting the stems of the different twigs the blossoms can be forced open from three to four hours earlier. In the experiments carried on, a gain of from one to two days was realized by the use of warm water and the splitting of stems.

After the anthers dehisce and the pollen becomes ripe, a small vial properly labeled, is used to collect the pollen. By removing the hoods the pollen can be very easily dusted into the vials with the aid of small camel's-hair brushes. Plate IX shows the vial, properly labeled and plugged with cotton, which is used by the writers to carry the pollen to the orchard. In these vials the pollen will keep until ready for use, if sufficiently dried. If it is not dried enough, fermentation will set in quite easily. Very gratifying results have been obtained by collecting the pollen in this manner. At the present time it is not known just how long pollen can be kept before losing its viability. At this station good results have been received from pollen that had been gathered three weeks.

One of the simplest ways of procuring pollen is to cover with paper sacks branches that are nearly in flower, and the ripened anthers from these blossoms can be used for pollination purposes. Another method is to put in a warm room unripe anthers from flowers about to open. In a few hours the

anthers will dehisce. Many pollenizers use this method in cases of emergency. Perhaps the most popular way of collecting pollen is to pick off the unopened buds, remove the anthers, and let them dehisce.

After trying some of these methods outlined we decided that better results could be obtained by the use of the forcing-house. In a house twelve by fourteen feet, containing from twelve to thirty jars of blossoms, sufficient pollen can be gathered to carry on very extensive experiments in cross-pollination.

APPLYING POLLEN TO THE PISTILS.

We have found that the quickest and most effective way of applying pollen to the pistils is by the use of a small pointed camel's-hair brush, having a handle from six to eight inches long. (Plate IV.) While in this way more or less pollen is wasted in making the application, nevertheless the disadvantages are greatly offset by the advantages. Brush pollination is very effective, also allowing for great ra-

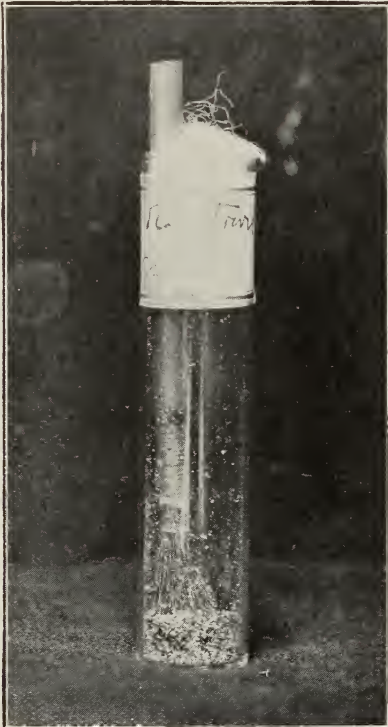


PLATE IX.—SHOWING METHOD OF COLLECTING AND TRANSFERRING POLLEN



PLATE XIII.—BLOSSOMS READY FOR EMASCULATION.

This should always be done before the petals unfold. However, when possible emasculation should be delayed until the petals are nearly ready to open.

pidity; and when a great many thousand blossoms must be pollinated it is the most practicable method used. The simplest way of applying pollen is to touch the stigma with a dehiscent anther. Another method is to dip the thumb or fore finger in the pollen and then transfer to the stigma of the pistil.

When using the camel's-hair brush too much care can not be exercised in making the application. Enough pollen should be placed on the stigma so that it can be readily perceived. In all cases each kind of pollen for each variety pollinated must have its own brush if scientific results are to be obtained. By sterilizing the brushes they can be used over and over again.

WHEN TO MAKE APPLICATION.

There appears to be considerable controversy as to the best time of applying the pollen to the pistils. The indications are that much depends upon the maturity of the buds whether or not a pistil is receptive at the time of emasculating. The receptiveness of the pistil is also influenced by such elements as climatic conditions, vigor and age of tree, variety, condition of soil, and general care of orchard.

The paramount question to settle is whether better results can be obtained by applying the pollen at the time of emasculating or waiting until the pistil is receptive. From the deductions made of the work carried on by this station, excellent results have been obtained by applying the pollen to the pistil

as soon as the blossom is emasculated. However, this may have been due to the fact that the blossoms operated upon were those that would probably open under normal conditions in one day from the time the operation was performed.

From the results obtained it is evident that in a great many varieties the pistils are receptive before the blossoms open. This being the case, it tends to show that nature encourages cross-pollination rather than self-pollination. One of the greatest advantages of pollenizing at the time of emasculating is the saving of time, as the bags will not have to be removed.

There are many plant-breeders that do not make the application until two or three days after the blossoms have opened. These men have also received very satisfactory results. Professor S. W. Fletcher, of the Virginia Agricultural College, usually waits until the stigma of the emasculated blossom glistens before making the application. Many other investigators pursue the same method. By consulting Tables IV. and VII. the percentages of successes of the two methods can be readily seen.

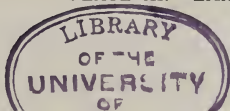
POLLEN TRANSMITTED THROUGH THE AIR.

It has been a question in the minds of many experimenters for some time just how much the wind aids in carrying pollen from tree to tree. If the wind does aid in distributing pollen, is it distributed in sufficient quantities to insure the fertilization of the ovules? Since so many of our varieties of apples are known to be self-sterile, and must depend upon

foreign pollen for fertilizing the ovules, this question is of serious consequence. Is it the wind or our common honey-bee that does the work? From the observations made the past two years it is evident that bees play an important part in the fertilization of the blossoms. To arrive at some definite conclusions as to how much pollen is transmitted through the air by the wind, experiments were carried on to determine this question. Waugh, of Massachusetts, demonstrated that plum pollen was not transmitted through the air in sufficient



PLATE XI.—EMASCULATING AND BAGGING BLOSSOMS.



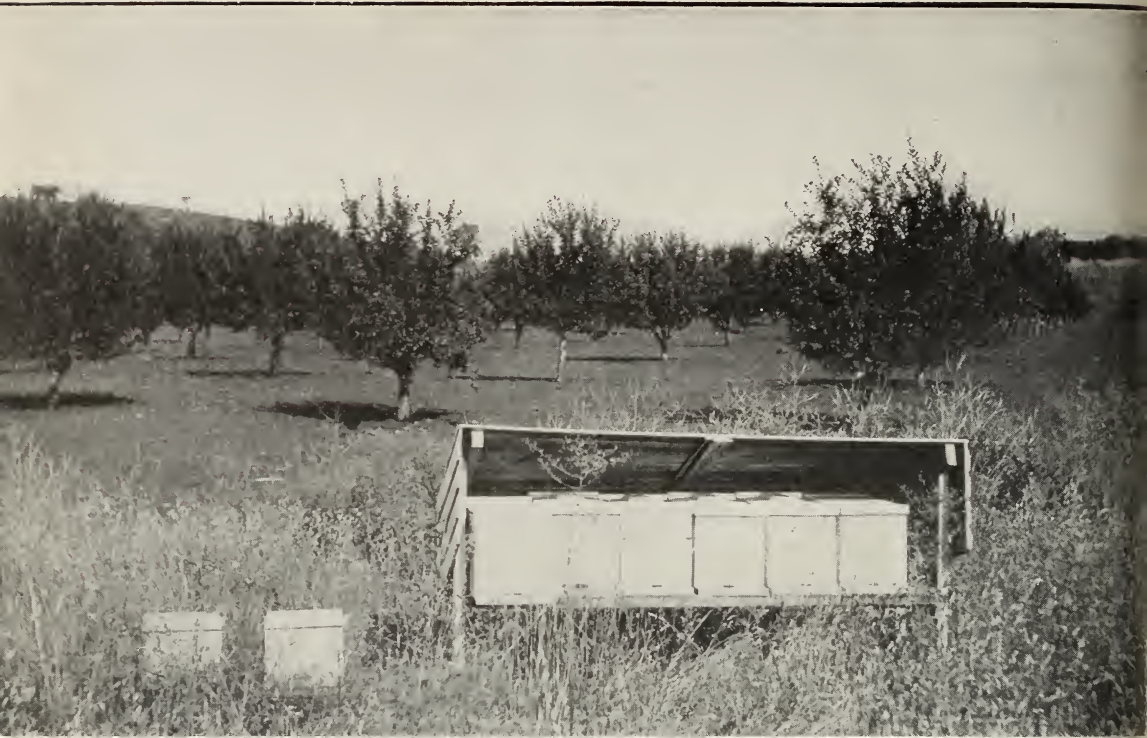


PLATE X.—APIARIES SHOULD BE KEPT IN ORCHARDS, AS THE BEE IS THE BEST AGENT FOR CROSS-POLLINATION.

quantities to insure cross-pollination. To substantiate his statements the authors carried on some experiments with plums, as outlined by him.

To determine whether apple pollen was carried through the air by the wind in sufficient quantities to insure cross-pollination, experiments were conducted in the following manner. Small glass slides, one by three inches, were smeared with vaseline and placed at different distances and at different heights from certain large trees in the orchard. In this case, two of the largest trees in the orchard, the Rome Beauty and the Mammoth Black Twig, were selected. After an exposure of twenty-four hours the slides were taken to the laboratory and examined under the microscope. The following indicates results obtained:

TABLE I.—SHOWING DISTRIBUTION OF POLLEN BY WIND.

Slide number.	Distance from trunk of tree.	Height of slides.	Number of pollen grains.
1	4 feet	On ground	16
2	12 feet	6 feet	9
3	15 feet	4 feet	11
4	15 feet	6 feet	8
5	20 feet	9 feet	6
6	30 feet	6 feet	7

During the experiment a strong north wind was blowing, and the trees were in

the height of their blooming period. The conclusion to be drawn from this experiment is that the wind can not be relied upon as an agency to transfer pollen from tree to tree throughout the orchard.

To verify our last experiment the following work was carried on: A seven-year old tree containing 1500 blossoms was emasculated and left exposed to the wind and insect visitation. The object of this experiment was two-fold: First, to determine if pollen was transmitted through the air in sufficient quantities to insure cross-pollination; second, to determine if removal of the floral part of the blossom would affect the visits of insects. The tree operated upon was located twenty feet from another tree that blossomed profusely. It is generally conceded by many experimenters that the honey-bee is attracted to the blossom by the inflorescence. The results obtained will be a fair index as to the truth of this statement. Out of the fifteen hundred blossoms emasculated, only five set fruit. During the whole period that the pistils of these blossoms remained receptive, only eight bees visited the tree. More than twice that number were seen in one half hour on the tree twenty feet away. Since only a small portion of the emasculated blossoms set fruit, it is manifest that pollen is not transmitted through the air in sufficient quantities to in-

sure cross-pollination. While this experiment demonstrated the fact that bees will visit trees when the floral part of the blossom is removed, they are not attracted in sufficient numbers to insure perfect pollination. It is apparent that the showy petals of the blossoms aid materially in attracting the bees. The blossom is well supplied with nectar, and the open character of the nectary makes it accessible to almost all insects. The bees, in trying to reach the nectar, brush against the anthers and carry away with them on their hairy legs and abdomen large quantities of pollen. The insects in visiting other blossoms transfer some of the foreign pollen to these pistils. Since the wind aids so little in cross-pollination it is evident that the various insects, especially the bees, are carriers of pollen.

As the assurance of a crop depends upon insects as distributors of the pollen, it is necessary that apiaries be established in the different fruit sections. With favorable climatic conditions and proper planting of varieties the bees would insure pollination.

SELF-STERILE AND SELF-FERTILE VARIETIES.

A knowledge of the sterile and fertile varieties is essential in pollination work before any definite investigations can be conducted. A sterile variety is one that will not fertilize its ovule with its own pollen, while a fertile variety is one that will perform this function. Since investigators have found that climatic conditions influence greatly the sterility and fertility of a variety, it is doubly important that this experiment be demonstrated in every locality, especially when a wide variance is found in the climate. Eastern conditions are hardly applicable to those found in the West.

The method usually followed to ascertain this question was to inclose the blossoms in cloth or manilla bags before they opened, thus removing all danger of foreign pollen from insect visitation. After blossoms open and the anthers expand, the pollen is scattered on the several stigmas; and if the blossoms set fruit it is evident that the variety is self-fertile; but, on the other hand, if the pistil shrivels and dries up it is sufficient evidence that the variety is self-sterile. For this experiment it is very important that the right branches be selected. Outside branches should be chosen, as they are more favorably situated. In every case all the open blossoms should be removed before sacking. Too much stress can not be placed upon this important question if accurate results are to be realized.

In 1907 three grades of bags were used, namely, the manilla paper bag, the fine and the coarse cheese-cloth bags. Since inclosing blossoms in bags is subjecting them to unnatural conditions, these three styles were selected in order to detect, if possible, any difference that might arise in the setting of fruits. As the effectiveness of the three bags was the same, in 1908 we confined ourselves to the manilla bags.—*Better Fruit.*

BEE-KEEPING IN HAWAII.

BY ALBERT F. JUDD,
President of the Hawaiian Bee-keepers' Association.

Bee-keeping in Hawaii can not be understood without appreciating some geographical facts. Hawaii is north of the equator. It is a full-fledged organized territory of the United States, and consists of eight inhabited islands. It is just as much a part of the United States, so far as the laws go, as the Territory of New Mexico or Arizona. It is a white man's country, although the majority of residents are Chinese and Japanese. In area the islands equal approximately the area of Connecticut. We have two mountains on the large island of Hawaii (from which the group takes its name) each of which is very nearly 14,000 feet high. We have all degrees of climate except the intensely hot climate of the pure tropics. A glance at the map will show that the islands are close to the Tropic of Cancer. The cool ocean currents from the Pacific Coast, with the northeast trade winds, make the climate never oppressive, even at sea-level.

The first honey-bees were introduced into the islands in 1857. In the '90's, bee-keeping began as an industry. Its beginning was slow, and it was not until January, 1907, that the bee-keepers came together and formed the Hawaiian Bee-keepers' Association. Our present membership is thirty-seven, and includes all those engaged in the production of honey and wax for profit, besides others interested in the industry scientifically or for pleasure.

The honey and wax industry in this Territory is valued at approximately \$200,000. About \$30,000 worth of honey was produced during 1907, and \$6000 worth of wax. We estimate the number of colonies at present in the Territory at 20,000, and it is believed that this number can be doubled. If this is done, the normal honey flow is expected to produce about \$100,000 worth of honey and wax. The bee-keepers of Hawaii spend annually between \$2000 and \$3000 for supplies, most, if not all, of which come from the mainland of the United States.

There is at present in our association a spirit of coöperation, not only among the members—resulting in an interchange of ideas on the many problems existing in the apiaries and in the marketing of the product—but also between the association and the various officials of the Department of Agriculture at Washington and the local agricultural station under whose jurisdiction matters pertaining to the industry more directly come.

At the present time the diseases of American or European foul brood are not found in the Territory. We have secured protection from the introduction of these diseases by legislation.

Another work that our association has taken up is the introduction of plants and trees to improve the bee pasturage, and satisfactory progress has been made. The food

and drug act of June 30, 1906, passed by Congress, has brought Hawaiian honeys into prominence because of the chemical composition of some of the honeys elaborated by our bees from honey-dew, and we assisted in adjusting these matters by sending Mr. D. L. Van Dine, Entomologist of the Hawaii Experiment Station, to Washington. Our association also has had as its guest, recently, Dr. E. F. Phillips, in charge of the office of apiculture at Washington, who has made an examination of bee-keeping in Hawaii, and whose report thereon is awaited by us with interest.

We appreciate the opportunity afforded by GLEANINGS to get in touch with the industry on the mainland. We are open to suggestions for improvement. Any thing that can improve the honey-bee and its products is eagerly sought for by us.

NOTES ON TRANSFERRING.

Tools and Appliances for the Same; the Direct vs. the Indirect Method of Transferring.

BY F. DUNDAS TODD.

In the past two years I have been concerned with the transferring of over three dozen frame hives and one box hive to the style that I favor, so that I have had a chance to improve a little on the procedure that I described in an article two years ago. I have worked both the direct and the indirect systems; but after taking into consideration all the factors, methods, and results I can not make up my mind which is better.

Direct transferring is an occupation I would not of choice care to follow up day after day for a few months; but, on the other hand, it has ceased to have any terrors for me, as, with suitable arrangements and the aid of an assistant, I have handled three hives per hour for several hours in succession.

In direct transferring one gets through with the job at once; the hive is speedily at work in a normal condition, and, best of all, the proposition is off one's mind. My experience with indirect transferring (or what is known as the Heddon method*) was in a poor season, and so I saw it at its worst; but it took over three months to get rid of the last of the odd-sized frames, and all the time I felt I was hindering the work of the bees.

In transferring direct I feel I have made some new departures that are advantageous. The slop of honey annoyed me greatly, but I hit upon the idea of doing all the cutting of the combs and all the fitting of them into the frames in a tray whose dimensions are 12×20×2 inches; in fact, one of my feeder trays, whenever it got sloppy it was a simple matter to turn the hose pipe on it when such was handy, or to rinse it out with a pailful of water. In actual practice I found it neces-

sary to wash the tray after a hive was treated, and no oftener. On my left hand I had a similar tray for reserve bits of comb; on the right was a pail into which the scraps were dropped, these being made up principally of drone comb.

In transferring my own hives I had the use of a barn with a screen door so I could carry in two frames at a time, and work without being bothered by the bees. Of course, I wore a veil; but my fingers were uncovered from the knuckles down, and I can not recall having received a sting. When helping a friend with nine hives I worked in a barn without a screen door. He carried the combs; I did the cutting and fitting; but it was not until we got to the last hive that I began to get my fingers stung. By that time a steady stream of bees was working all around, so I had to select the spots before I touched a comb. Occasionally I guessed; and whenever I guessed wrong—well, I quickly found out the difference between bee and no bee. When the job was finished, there was not a bit of slop on the bench or floor to indicate that about 80 combs had been cut to pieces; and this, too, in August, when combs were heavy with winter stores.

Using the shallow extracting-frame I have rarely any call for string. Wire nails about two inches long are good enough. When the comb neatly fits the frame, all that is necessary is to insert nails in each of the four wire holes at the ends of the frames; then with an awl bore a hole through the middle of the top-bar; push in another nail, and the frame is ready for the hive. To get an exact fit, I find the best thing to do is to have a piece of board the exact size of the inner dimensions of the frame, and use that as a guide, for one gets perfectly square cuts; but if we use the frame itself, the cut is generally on the angle—at least that is my experience.

With pieces of comb smaller than the frame area I find it best to work to square-cornered shapes, trying always to get pieces reaching from top to bottom of the frame. Extra nails in the top and bottom bars within an inch of the joining of the pieces of comb generally keep all in shape. There is much virtue in a tight fit, so I never hesitate to squeeze a scrap of comb into a solid mass and force it between the side of the frame and the comb. The bees remove these in due time.

In the season of 1909 I tried indirect transferring with over a dozen hives—some of them Gallups, with frames about a foot square; some almost Langstroths; others, Jumbos. The spring had been backward, so it was not until the end of May that I could start the campaign. As opportunity offered, I transferred the empty combs and placed them in a two-story divisible hive; then the old frames were added. The Gallup frames, being short, had to be provided with extra top-bars, which were screwed to the old ones. While some other frames that were too long had to be shortened. Any way, bit by bit I got all the frames into divisible hives, always

* For a description of this method see the A B C and X Y Z of Bee Culture, under the head of "Transferring."

working the old frames to the sides as the hives grew stronger; then when they were clear of brood they were removed and transferred. The season being a blank one, new combs were built slowly, and I had no spare ones, so it took until the end of August, over three months, to get rid of the last frames. In an average season I fancy six weeks would be enough.

Whatever may be the usual conditions I don't know; but this season I noted particularly the bees speedily united pieces of comb whose line of contact was perpendicular; but they merely gnawed the edges above and below when the junction was horizontal. None of such combs were put into use, so I have them stored away, and will try them again next season, when the honey-flow is on, and see what the bees will do about them.

Victoria, B. C.

NO CARBOLIC ACID USED IN SPRAYING FRUIT-TREES.

BY R. F. HOLTERMANN.

That carbolic acid will prevent the visits of bees I am quite sure, for I have used it frequently to drive the bees out of comb-honey supers—a plan I learned from European bee-keepers. A weak solution, one that will not burn the skin, is prepared, a cloth dipped in it, and wrung out. This cloth is then laid on top of the supers, and the bees will leave the sections with a rush. No doubt this same odor would also keep the bees away from the blossoms.

But here in Canada the fruit-growers find that they are jeopardizing their crop if they spray the trees while in bloom. Just think of covering the sensitive and delicate portions of the blossom with a spraying solution! The pollen would very likely be injured and kept from being distributed, and the portion of the blossom to receive the pollen would in many instances not be in the right condition. The addition of carbolic acid would not overcome this difficulty for the fruit-grower. So far as I know, there is less and less of this practice of spraying trees in bloom in our country. In an orchard where some varieties or kinds of fruit bloom sooner than others, there is a strong temptation to spray all at one time, so some are apt to be sprayed while in bloom; but I have been told of very bad effects to the crop of fruit after such work, and I fancy that this fact is now pretty well known.

In regard to the use of carbolic acid, I wrote to Mr. P. W. Hodgetts, Department of Agriculture for Ontario, who is secretary of the Ontario Fruit-growers' Association as well as of the Ontario Bee-keepers' Association. I received the following reply:

Dear Mr. Holtermann:—Yours of the 18th is at hand. So far as I know I have never heard of any of our fruit-growers using carbolic acid for the purpose of preventing bees from visiting fruit-blossoms. Carbolic acid is not used in any of the formulae that we send out from this office for the spraying of fruit-trees at blossom time. It is used in a limited way in connection with some of the washes for scale insects in cer-

tain sections of the Western States, but very little in this country. It is also used to replace the Bordeaux mixture in grape-spraying by a few men in the Niagara district, but is not recommended by this Department.

P. W. HODGETTS.

Toronto, Jan. 21, 1910.

BEE-KEEPING NOTES FROM TEXAS.

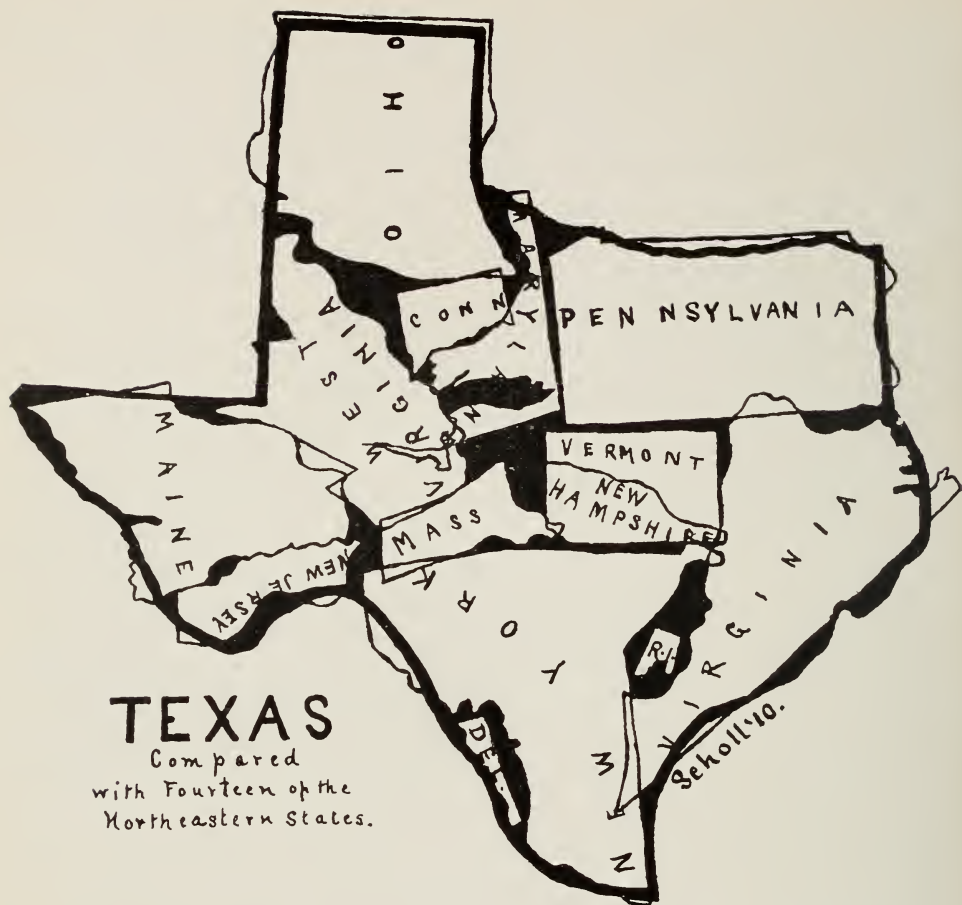
The Widely Differing Conditions of Climate, etc., in the Lone-star State.

BY LOUIS H. SCHOLL.

With the splendid prospects for one more of those good old-time honey crops in our charming southern country there has been a marked revival of interest in bee-keeping and a renewed activity among the bee-keepers. And not only have our own bee-keepers been influenced, but it seems from the numerous inquiries from outsiders concerning Texas that this influence has spread to all parts of the country, attracting more interest to bee-keeping in the great Lone Star State than in any other country at the present time. We are proud of this, for no other country (we call Texas a "country," for she is too big for a State) has made such great strides. While Texas is the leading State in the Union as a honey-producer, yet bee-keeping here has not nearly reached that stage of development that exists in most of the other States. The annual output of honey is enormous, but we know that there are thousands of acres wasting millions of pounds of nectar that could be saved by the up-to-date progressive bee-keeper.

It is impossible to give any idea in figures of the honey produced in this State in average years, as it has been impossible to obtain any thing like reliable statistics. This is due to the fact that almost the entire product is consumed at home, a very small part of it going outside of the State, and then only into adjoining ones. In that sense Texas is a State of its own in the production of honey, consuming what she produces herself. It is to be hoped that the new census will aid us in ascertaining approximately, at least, what our annual product has been the past year. From this it would then be possible to draw an idea, but an idea only, as, since the honey crop was a short one the past year, the showing that will be made in the census figures will by no means give us the output of an average year. But the fact remains that Texas is the leading State for output of honey, number of colonies of bees, and as a honey-producing State as regards the vastness of its area, its great variety of locations, soils, and climatic conditions.

On this account I wish to call the reader's attention to a few facts. After trying to cover up Texas with fourteen other States, as shown in the engraving herewith, it was found that it was still quite in evidence, as shown by the black parts of the picture. Now, this shows the vastness of its territory as compared with that of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island,



Connecticut, Maryland, Delaware, New Jersey, New York, Pennsylvania, Virginia, West Virginia, and Ohio—the whole of northeastern United States. Imagine the great number of localities there must be in this vast stretch of country, from north to south and east to west! Then the variety of bee-keeping conditions, both in latitude and altitude, must be taken into consideration. While we have conditions not far different from those of some of the States of the North, we also have conditions of the very tropics. These will be described a little more fully in a succeeding article.

But there is a reason why this comparative map is shown. Letters by the score have come to me, something on this order: "I would deem it a great favor if you would take just enough time to tell me in a few words where I can find a good location, on a railroad, near school and church, and close to some city, with good roads to market my crop. I expect to pull up stakes here, but would like to have you tell me where to go before making the move to a new place." One of the main things left out in the letter above is that the writer has not mentioned the kind of church he belonged to so I might

have looked after that; also, in selecting the suitable spot.

Now look at the map before us and let us ask ourselves this question: Am I thoroughly familiar with bee-keeping matters and the bee-keeping locations of the fourteen States, from Maine, Indiana, and down to the Carolinas? Could I tell a man "from Texas" just where he might locate in a little "nest" as is requested in the sample of letter above? I must admit that I could not. Now consider the vast difference in climatic and other conditions, more especially the flora of that State, which exist in Texas—much more varied than throughout the fourteen States here shown, stretched over a much greater area, and then ask whether it is really right to write for such information to one single little "six-foot-three" fellow, who is only an invisible speck on the face of the great Long Horn State.

Considering all the above, the best way for a prospective Texas bee-keeper to pursue is to take advantage of one of the many cheap home-seekers' excursions run every summer, to come to Texas, spend some time here, look over the ground thoroughly, select a place, and then, and not until then,

pull up stakes where previously located. Then when once here, as a bee-keeper of this great State, the new comer should make up his mind that he is going to like the new place and the *new State*. We want no people here who are always dissatisfied, no matter where they are nor what their lot is. There are such that are always grumbling about their surroundings. We do not need them. But the real, energetic, interested hustler has a chance, if he will try things and stick to it. It must be remembered that we have adverse seasons here sometimes as well as elsewhere; however, these have been comparatively few, and, taking year for year, our seasons have been above the average as compared to other parts of the country. Taking it all in all, Texas bee-keeping has a brilliant future. All we have to do is to stick to our business, improve as we go along, and our efforts will not be in vain.

New Braunfels, Texas.

COMB VS. EXTRACTED HONEY.

Comparative Results of Comb and Extracted Honey Production in the Buckwheat Regions of Eastern New York; Buckwheat as a Honey-plant.

BY FRED G. MASON.

My father began bee keeping in 1864, and continued in the business to the time of his death, in 1898, leaving me at that time with 84 colonies in winter quarters. I was brought up in the business, and often helped him when not otherwise employed. I read the bee-journals from early boyhood. Hearing of E. W. Alexander and his large apiary in New York I became very much interested, and finally managed to spend ten days helping him during the busy season. This was a most profitable and pleasant experience, and I will long remember Mr. Alexander's kindness to me in answering questions and giving me the benefit of his experience and advice.

It was due in a great measure to Mr. Frank Alexander that I was placed in sole charge of a good-sized apiary in the buckwheat country last season. The 226 colonies in this yard had gone into winter quarters in the fall of 1908 in very good condition by reason of a continuous light flow from buckwheat, which kept the bees rearing brood long past the usual time (a condition that was quite reversed last fall). The bees were taken out of the cellar April 2 and 3, 1909, and had a fair flight. By the middle of May the apiary consisted of about 210 colonies which had survived the severest spring weather that I can recall. As soon as fruit-bloom came, weather permitting, I began overhauling the bees, equalizing stores, clipping queens, etc. I soon noticed that most of the honey in the hives was candied as hard as a board, the bees using it of necessity rather than of choice. I reasoned that, as soon as they could obtain new honey in a sufficient

amount to keep up brood-rearing, they would no longer touch this old honey, and it would be in the way, in many cases, enough to curtail brood-rearing sadly. Therefore, as soon as the bees were bringing in new honey sufficiently I began removing this candied honey, substituting the best breeding-combs that I could select from the stock of extracting-combs, always leaving a frame or two of the candied honey for outside frames. I usually selected the lighter combs to remove, for fear that weather conditions might prevent a continued supply of new honey.

On my second trip over the yard I found quite a number of colonies that had almost reached their limit in brood-rearing, and to such colonies I gave a second story containing the best of the empty brood-combs with a comb of candied honey, from which the cappings were removed, next to each side wall. Soon there were great slabs of brood in those second stories, and the bees were bringing in clover honey quite freely. I soon reduced the colonies to one story each, helping out the weaker ones with sealed brood from the stronger ones, and forming new colonies with extra combs of brood not required for this purpose. These new colonies were, for the most part, supplied with laying queens. This apiary was equipped for both comb and extracted honey, and I was obliged to run for both, even though I already had a preference. The prospects for next season were good, sweet clover being quite abundant, and many fields of alsike giving promise of full bloom. Basswood, moreover, was plentiful and the trees were a sight to behold, being weighted down with buds the like of which I had never seen before.

In placing comb and extracting-supers on the hives I was very careful to pick out the most powerful colonies for the comb-honey supers, leaving the rest for the extracting-supers, and after finishing this work I found that the comb-honey colonies outnumbered the others. I had plenty of bait-sections, so I usually used ten in each super, five of them being sections that had perhaps been worked on a little, the other five being quite well drawn out.

The white honey-flow did not prove to be as great as I expected, for, with the exception of a few days, the weather was anything but ideal. The nights were very cold, and the days were nearly always cool and often windy. Along in April the bees did not usually go to the fields until the morning was well advanced, and by three o'clock work was almost at a standstill because of the cold. Notwithstanding these adverse conditions I secured what many would call a fair crop of white honey, and removed both the comb and extracted honey before the bees made much headway on buckwheat. At least 90 per cent of the extracted honey was sealed when removed. I soon had empty supers in place ready for the buckwheat crop.

I was very much surprised when I came to compare the results of the comb and ex-

tracted-honey colonies after this light flow I found that the extracted colonies eclipsed the others in the amount of surplus honey secured, and that, too, at fearful odds as to strength and working force. To be sure, I had made some changes with a few comb-honey colonies on account of their swarming, running them for extracted honey for a short time. In some cases I did not change them back; but still these changes did not greatly affect the result, as they were usually offset in some way.

I decided to take particular pains during the buckwheat flow to determine, if possible, the comparative merits of producing comb and extracted honey. I again used the most powerful colonies for comb honey, selecting 120 colonies for this purpose, leaving the remaining 100 for extracted honey. The first buckwheat in bloom was a large field of Japanese. The weather was quite satisfactory, and the bees were doing well. Other fields began to grow white; but the weather became less and less favorable until the buckwheat reached its prime, while the bees were shut in entirely for about twelve days on account of the cold and wind. There was a large acreage sown to buckwheat, and quite a portion of it was late, so I hoped that the bees might yet have a fair show. It lasted very late, and the weather warmed up a little; but the buckwheat did not yield much, in spite of the fact that there had been no frosts. I began removing both comb and extracted honey, using bee-escapes. It took two days or more for the bees to get down out of the supers, yet this was by far the most satisfactory way.

The extracted colonies yielded all of 5400 lbs. of nice honey, the greater part of it being sealed when removed, and there was plenty left for winter stores, with the exception, perhaps, of two or three. The comb-honey colonies produced less than 2500 lbs., much of which was not well finished, and these colonies also were left heavy in stores for winter. The total crop for the season amounted to something over seven tons. If the yard had been run for extracted honey wholly, there would have been much better returns, together with a smaller cost of labor.

AMOUNT OF BUCKWHEAT NEAR DELANSON.

When I was helping Mr. Alexander I asked him what he thought the acreage of buckwheat was within his bee-range; and after a moment he said it was probably all of 1500 acres. I did not question his assertion in the least; but it was my privilege last fall to prove to my satisfaction that Mr. Alexander's estimate was most conservative. I remember reading of Mr. Orton's visit to Mr. Alexander in the fall of 1908, as mentioned in his article in GLEANINGS, in which he stated that he was a farmer and could judge the size of fields fairly accurately, and that from Schenectady to Delanson, a distance of fifteen miles, he had estimated the number of acres as being not more than forty-five. Now, if Mr. Orton had made a complete circuit of the Alexander yard, for $1\frac{1}{2}$ miles in every direction, he would have found single fields that contain-

ed more than forty-five acres. I interviewed a local thrasher, this fall, when his season was over, and he told me that he had thrashed over 13,000 bushels within $1\frac{1}{2}$ miles of the yard which I had in charge, and he said he was sure that he had not thrashed half of that which was grown in this space. I asked him what the average yield was per acre, and he said 25 bushels. This would make more than a thousand acres of buckwheat grown within $1\frac{1}{2}$ miles of the apiary. If a radius of two miles were taken there would be more than double this amount—that is, more than 2000 acres of buckwheat that the bees would have access to in fair weather. One season the former owner of the apiary sowed quite a field of buckwheat earlier than any sown by his neighbors. The season happened to be such that he obtained practically all of his buckwheat honey that year from this one field. I mention this to show that an extra large acreage of buckwheat often cuts but little figure in the crop of honey. Had the area sown to buckwheat in this section last season been so increased as to make one continuous field to the limit of the bees' flight, I very much doubt whether it would have added much if any to the amount of honey secured. My belief is that a section of country that has, say, 500 acres of buckwheat in bloom within easy range of an apiary, will produce all the nectar that a large apiary can bring in. Much more than this amount would not help the bees during the time they were gathering their loads of nectar, whether the blossoms were yielding bountifully or meagerly.

Fabius, N. Y.

MOVING BEES UNDER IDEAL CONDITIONS.

BY G. C. GREINER.

The various experiences of a lifetime had forced me to believe that moving bees, even under the most favorable conditions, was an unpleasant job. But my last venture of this kind has convinced me that it can be done, not only comfortably but with a considerable degree of enjoyment as a winter sport.

Last May I moved about half a mile from the old home, and the question arose as to how and when it would be best to move the bees. They could have been moved at the same time; but their former location being so near by, and the season far enough advanced so that all field workers had generally formed their lines, many would undoubtedly have gone back to their former stands and perished.

I decided to leave my bees at the old place during the summer, and work them somewhat like an outyard, intending to move them, during the winter, on snow. This would be an easy matter if the hives could be loaded singly, with perhaps the help of a boy, on to some kind of sleigh rig when we had sleighing. But the bees had to be packed for winter when they were in proper condition before the snow came; and after they



G. C. GREINER'S METHOD OF MOVING COLONY SLEDS IN WINTER.

were packed they were in sheds holding five colonies each, and weighing about 500 lbs. To load one of these sheds and handle it as carefully as bees should be handled would require a number of hands, which would be difficult to find just when I wanted them.

At first the undertaking looked a little dis-

being raised. The tool at the left is the lifter: the drawing makes it plain enough so that a description is not necessary. With the roller attachment, which I consider a great advantage, it works so smoothly that it does not jar the sheds in the least when being operated.

In their natural positions all sheds are blocked up about six inches from the ground; and to load them, each one had to be raised from four to six inches from their foundation. To do this the left end of the shed is raised first, just high enough to let the little bench take its place. Then the other end is raised about

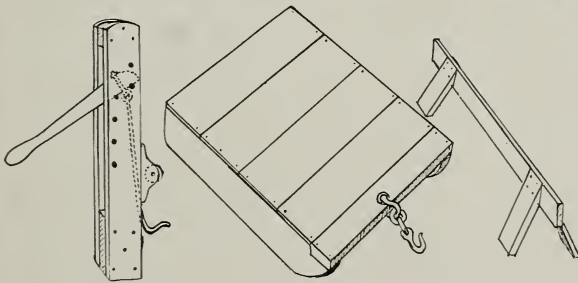


FIG. 1.—TOOLS FOR LOADING AND MOVING SHEDS OF BEES.

couraging, but after manufacturing the necessary tools and contrivances I succeeded so well that I did the whole business easily without the help of a single person.

The tools I used in loading and moving are shown at Fig. 1. In the center is the rig I used for moving. It is a combination of sleigh and stoneboat. The runners are 3×6-in. timbers, with a level one-inch platform on top. At the right is a bench about 12 in. high, made like a common saw-horse. It is used to support the shed after

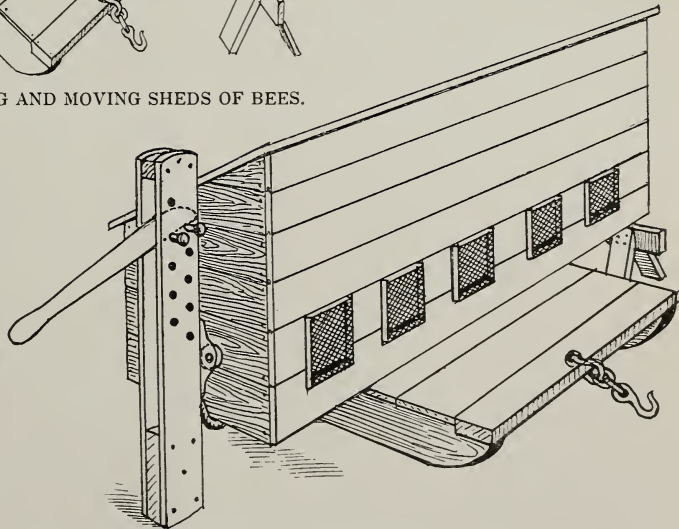


FIG. 2.—ELEVATED SHED WITH SLED IN PLACE READY FOR MOVING.

the same distance from the ground, and the sled put in its proper place. Fig. 2 shows the shed in that position with the sled in its place ready for loading.

When unloading, the shed is first raised from the sled in the same way as when being loaded; and after the sled is removed, the shed is lowered on to its foundation-blocks again.

By the use of the tools here described I was able to handle all sheds in such a steady, quiet way that the bees hardly noticed the operation. The conditions of the weather were also very favorable for the job. We had from 8 to 10 inches of fresh snow; and as I selected thawy days for the moving, when the old snow below was soft, the trips were made without a jar, jolt, or jump to disturb the bees. In only a very few instances could small clusters be seen inside of the screens, and most of them went back before their sheds were unloaded.

LaSalle, N. Y.

RESULTS OF BEE-KEEPING LEARNED FROM BOOKS.

A History of a Beginner's Mistakes and Experiences.

BY MARTHA K. PURSELL.

Continued from last issue.

CHAPTER TWO.

All of my colonies wintered well except No. 6, which perished from too much coddling. Thus the spring count was three hives.

1. Golden bees No. 2.
2. Leather-colored Italians, Ferris hive. This later became Nos. 3 and 4, as I found it too heavy to work as one.
3. Hybrids with poor queen (No. 5).

No. 2 swarmed, so after the flow was on there were five colonies at work.

All were given section supers except No. 5, which produced all its honey in Hoffman frames.

Nos. 2 and 3 were shaken upon shallow combs at the time they were supered. The deep combs were left alongside until all bees had emerged, when they were shaken into their respective hives. Instead of going into sections at once, each of these hives filled the upper set of combs solid with white honey. This was removed, and the sections placed just above the brood, when the work went forward as planned. A story of foundation was put under all when the honey was removed. The honey was so easily produced, and was of such fine quality, that in July five more stands of bees were bought, as I hoped for a fall crop. In this I was disappointed. The crop was a little over 200 lbs. There were 92 Danz. sections, and the rest was extracted. There would have been about 60 lbs. more of extracted, but the heavy combs would not bear the strain of the extractor, so they were reserved for spring feeding.

All hives have sufficient stores to last till fruit bloom, and have young queens. No. 3 has superseded its queen, but both queens were in the hive at the last examination. If both live until warm weather comes, the plan is to use the mother as a breeding-queen, in a nucleus hive, and thus Italianize the five hybrid colonies last purchased.

THINGS LEARNED DURING THE SECOND YEAR.

1. Necessity of knowing one's own location, and of having the initiative in one's own business. Had I read before the season what I have later, I am sure we could have secured more honey. Being desirous of having all we produced of superior quality, we sacrificed quantity to an unnecessary degree. The fancy extracted sold for 30 cts. per lb., and the comb for 25 cts. per section, and in my own town I could have sold several times as much.

2. To keep the overstrong colonies busy before the flow, in drawing out brood and extracting combs.

3. To work every strong colony, not busy drawing combs, in two stories, preferably having the upper one of shallow combs. Should there be an early surplus, this will keep the honey above and removable when the time comes for section supers. The lower story will thus be all used for brood, and be extra strong at the right time.

4. Never to buy bees without careful examination before purchase.

PLANS FOR THE THIRD YEAR.

There are ten colonies, three in sectional hives, group one; four in ten frame, dove-tailed, group two; three in Danz., group three.

When I find out which of these hives I prefer, I intend to confine myself to one kind of brood-chamber, using the others for supers, but now anticipate much pleasure with the three small groups.

In order to get a maximum crop I shall avoid lifting and prevent swarming. Group No. 1 is to be worked somewhat as Mr. Scholl does with a trial of some of Mr. Hand's kinks. Group No. 2 I should have preferred to work according to Mr. Doolittle's plan, but could not get enough deep combs drawn last year to have two sets for each hive. I think early honey can be prevented from clogging the brood-chamber by putting on a half story of combs or foundation, just as soon as the strength will allow—if possible, before fruit-bloom. Then if these half-stories are filled with honey I can put two together, using Doolittle's plans and transferring to sectional hives at one operation. This will also prevent swarming and give increase.

One of the Danz. hives has two stories, both of which are almost solid with honey. In August, two colonies were united as per "Facts about Bees," as I intended to extract one story but found it impossible, as the combs were not wired and were insufficiently attached to sides and bottoms. These Danz. brood-bodies were among the five hives bought in July, and have so much drone comb that many frames will have to

be rejected. All these combs were made from starters by swarms, so my policy will be to use full sheets for swarms, either natural or forced.

As I do not know that I shall want any more Danz. brood-bodies, my intention is to work these colonies in the same way as group two, up to the time of the flow, when the first section super will be put on between the brood-chamber and shallow story, removing the latter when work is well started in super. This shallow story can be put under all on the bottom-board. I intend to try this to see whether the bees will carry up the unsealed honey it contains, as Mr. Hand and others say they will. Otherwise these shallow supers can be put on hives run for extracted, used for increase or piled up for future use, or to fill combs for winter.

As I can sell extracted honey of superfine quality, in small but dainty containers, at the same price as section honey, my intention is to run all hives for extracted at the end of the season, using section supers only during the rush of the clover flow, and have all sections fancy.

I intend trying the method used by Mr. Townsend and others of having extracting-combs on the outside of all supers. The new N super has frames exchangeable with shallow extracting-frames, and the Danz. super can use the shallow Danz. frames. If this plan does not prove desirable, the frames can be used in sectional hives or in extracting-supers.

Mr. Hand has strong colonies drawing out foundation in sections during fruit-bloom. Mr. Danzenbaker does the same, and also has the colonies, not needed to work on "go backs," at work drawing out sections for use the following season. I shall also try this plan.

The producers of honey by the barrel may like extracting from brood-chambers, doing without excluders and using all frames interchangeably sometimes for brood and later for honey, but I am yet to be converted to a belief that those methods are for the producer who desires the whitest and choicest of fancy honey.

Mr. Alexander proves that a home yard can be made strong much sooner by judicious feeding of dilute syrup, thus preventing the loss of bees which go for water and never get back. I have four Alexander feeders and two division-board feeders. I will use these and take notes; but outside feeders wear out the bees, invite robbing, and supply the neighbors, so I can not afford them.

I intend to follow out Dr. Miller's plans of records and examination of brood-chambers while swarms may be expected. He has shown conclusively that the hive that does not swarm gets the largest surplus of comb honey.

Alexander's tin tags to indicate age and value of queens are good enough for me, as is his way of getting increase when running for extracted and of saving weak colonies by putting them over strong ones. But I would

never unite at any season without a sheet of newspaper between. This is as sure as and easier than a screen which must be removed and thus disturb them later. I do not believe any other way of using two queens is practicable unless one is working the sectional hive.

Being unable to manage the towers that Mr. Ferris must build with his two-queen method I intend to work out a simplification of Mr. Hand's sleight-of-hand tricks. My season does not oblige me to complete sections in thirteen days, so I hope to raise comb honey and still keep alive. It is no wonder that he prefers queen-rearing.

Wenonah, Gloucester Co., N. J.

BEE DISEASES IN CANADA.

A Case Where the Alexander Plan was a Failure; the M'Evoy Method Easier and Surer, and Less Expensive all Around.

BY J. L. BYER.

That article of E. M. Gibson's, page 125, tells exactly how the two methods of treating black brood work out in practice, as was proved in the work done by Mr. Warrington Scott, the first man in Ontario who had to battle with the disease. Although the colonies to be treated by the Alexander method were first made very strong, yet, after being queenless for 21 days, by the time the young force of bees came into the field of action the colonies were so weak as to be useless for the gathering of a surplus. While only comparatively few of the colonies so treated remained free from the disease, and the plan of removing all combs and shaking on to foundation was much more successful, Mr. Scott emphatically declares that, even if the Alexander method cured as many cases as the shaking plan, he would still prefer the latter method as being more economical in the end, all things considered. If a colony is made queenless right in the honey-flow, not nearly as good results will be obtained in the matter of securing a surplus as if the bees were thrown on to foundation. Indeed, there are quite a few who now claim that it pays to shake all colonies on to foundation, even if no disease is present; and personally we are inclined to accept this view *provided* a quick heavy flow of honey occurs right after the shaking and does not continue for more than two weeks or ten days. To be sure, it is well to remember that, as pointed out by both Mr. Gibson and the editor, locality may make a big difference in this matter of treatment, as in Mr. Alexander's section a lot of work could be done quite early in the season and still leave the bees in fair shape for the late flow that he so largely depended on. In a section where the only flow is from clover, entirely different methods must prevail if a surplus is to be obtained; and the shaking method, it seems to me, is the one for such places.

The modified plan as practiced by Dr. Mil-

ler reduces the period of queenlessness by quite a margin; but as our experience goes in the matter so far, it is not very likely that Mr. Scott will try any thing short of the more radical methods, in view of the pronounced failures experienced by using the full 21 days' term of queenlessness. Please do not think I am belittling Dr. Miller's efforts in the least, as I believe with all others that the plan has been a success with him; but as to such methods working out that way in Eastern Ontario at the present time—well, I for one sincerely wish that the remote success were a possibility.

In a footnote to a recent article of mine on this subject the editor does not think there is a difference in virulence, but rather inclines to the view that the difference in bees may explain matters. Regarding the virulence I can give no positive statement, as I have seen the disease in only one section, and can not give comparative evidence. As to the bees, it is only fair to say that nearly all in the affected district are blacks—regular old stagers that can sting a little quicker, and oftener, than any bees I have ever encountered. However, Mr. Scott's bees are now all pure Italians, and this past season an out-apiary of as pure stock as can be found on the continent was affected, and I believe they treated about 80 out of some 100 colonies.

While on this subject of black brood, I might say I am pleased to see D. M. Macdonald, of Scotland, also Editor Hurley, of the *Canadian Bee Journal*, making a vigorous kick against the term "European foul brood." The name has led to endless confusion, and why should we have any thing better (or worse) than the term "black brood," which all will understand? What's in a name, any way, so long as it expresses intelligently what we want to refer to? "Foul brood" is not such a high-sounding or scientific term by any means, and yet it answers its purpose finely. Why not drop "European foul brood" and say "black brood," and cut out all chances of confusion in the nomenclature of the two diseases? That the term does lead to confusion is evident in almost every bee-journal that comes to hand; and even Mr. Gibson, in his excellent article, gives us a hint in that line, as I believe no one who has ever handled genuine foul brood will think it is a possibility to cure the disease without destroying the combs. Therefore, instead of saying, as he does, that 21 days is not long enough for a colony to be queenless in order to effect a cure of American foul brood, better by far leave out the latter disease when discussing methods of curing black brood, as 121 days of queenlessness for a colony affected with genuine foul brood would be no more effective than 21 days, unless the longer term would give a chance for the wax-moths to get things cleaned up out of the way.

A BEE-LINE MAY NOT BE A STRAIGHT LINE.

As Raleigh Thompson points out, p. 125, a *bee-line* is not necessarily a straight line from the hive to a given point, even if we

all have heard the oft-repeated phrase, "as straight as a bee-line." West of our home apiary, until the last two or three years, there was a strip of high woods about half a mile in width. At the other side of this woods there has always been a lot of alsike grown, and the bees invariably fly around either the south or north end of the woods while going to and from the apiary to the clover-fields. During the flow of honey, if one went close to the woods on the east side no bees could be seen or heard; but on going toward the north or south ends they could be seen by the hundreds, although by taking these courses at least a quarter of a mile more would have to be traversed as compared with a direct course over the tree-tops. At the Cashel yard there is a tall row of spruce-trees directly north of the bees, running east and west; and off at one side of the yard a bit, there is an opening where a few of the trees did not grow well. All the buckwheat grown in reach of the bees has generally been directly north; and many a time have I noticed the bees going and coming through this opening in such swarms that it really seemed as though they would knock against one another in their flight. Really it is wonderful to see the bees from about 100 colonies working on buckwheat during a heavy flow, when practically all of them are going through an opening only a few feet wide. The point I wish to note is that the bees, instead of rising and going directly north in the direction of the buckwheat, rather preferred going west a short distance and then making a tack so as to avoid flying so high over the tree-tops.

While I am inclined to believe that bees are enticed toward nectar by scent, yet I rather doubt that the circumstance related by friend Thompson *proves* the matter. Two years ago there were hundreds of acres of alsike near us, some of it not more than two rods away from the bees, and yet for some reason there was no nectar in the blossoms. Last season we had a tremendous flow from alsike for six or seven days; and after that, although the clover was in bloom for two weeks more, yet hardly any more honey was secreted. How do we know that the field of clover mentioned by Mr. Thompson was yielding nectar previous to the day the bees were noticed working on it? Even if the bees were noticed around small patches near home, yet that does not prove conclusively that the field in question was yielding, as we have often observed that the bees would be working heavily on one field when possibly some other field nearer would have very few bees. Our only theory has been difference in soil conditions, as, generally speaking, the heavier clay soils do better in clover-honey production than do the lighter ones. However, I will admit that it *looks* as though the bees in Mr. Thompson's case did scent the nectar; yet I repeat, it is not a conclusive case by any means.

SHEEP TO KEEP THE GRASS DOWN.

The editor's advice to S. E. Williams, page 124, regarding the good work of sheep in an

apiary for the purpose of keeping down grass is sound, although a word of caution is necessary as to how the hives should be placed to avoid having them turned over on their sides.

At one of my yards the bees are wintered in rough cases, and then the hives are taken out in the spring about fruit-bloom time, and placed in pairs on stands six inches high. As long as the bees are in the cases the sheep in the yard are a fine thing; but as soon as the hives are on the summer stands after being taken out of the packing, I have always considered the sheep a bit dangerous to have in the yard. However, last spring, contrary to my advice, the owner of the orchard wherein the bees are situated let a flock of sheep into the yard about the first of June, thinking no harm would result. As a matter of fact, the same thing had been done in previous years a few times with no trouble. However, it was the old story of "the pitcher that off goes to the well, etc.," again; and when I went out to the apiary a few days after the sheep had been let in the yard again I found one of my best colonies with the hive lying over on its side, the cover off, frames all jammed together, and most of the brood dead. The hive was righted and frames adjusted, and the bees, depleted in numbers, went to work to make the best of a bad job; indeed, it was about as bad as it could be; for before leaving the yard in the afternoon the queen was found dead, dragged out at the entrance. Of course, that meant no surplus for the season from that colony; and as that apiary averaged over 150 lbs. per colony, we naturally were sorry that we had not cut all the grass ourselves. If the hives are close together the sheep will often get to rubbing themselves, and gradually work in between the hives. This process we have noticed more than once, so the remedy would obviously be to place the hives singly or else so close that not even the head of a sheep could get between. Certainly the presence of sheep in a yard is a nice way to keep the grass down, provided it is so arranged that no hives can be upset.

Mt. Joy, Ontario, Canada.

DIRECTIONS FOR "SPLINTING" FOUNDATION.

BY EMMET B. KIBBE.

I want to put some foundation in Jumbo frames, and not have it sag or buckle if I use medium brood. Will it be best both to wire and splint it? If so, shall I draw the wires taut? Ought I to wire and imbed the wire first, then apply the splints?

Must I have splints long enough to reach to the bottom-bar?

Cincinnatus, N. Y.

[We referred these questions to Dr. Miller, who replied as follows:]

The object of pressing splints into foundation in brood-frames is to prevent buckling, to prevent sagging and stretching of the cells in the upper part of the foundation, and especially to secure combs built clear down to the bottom-bars. The splints are placed perpendicularly in the frame, and are about $\frac{1}{4}$ inch shorter than the distance between top-bar and bottom-bar. That $\frac{1}{4}$ -inch space is merely for convenience in putting in, and it does not matter whether it is at the top, at the bottom, or divided between top and bottom.

As the bees are inclined to gnaw at the bottom of the splints, especially when little honey is yielding, some use five-inch splints, putting them at the upper part. This secures against the stretching of cells at the upper part, but with these short splints there must be wiring to prevent bagging at the lower part.

The foundation is fastened to the top-bar the same as when no splints are used, and the foundation is cut to fit close up to each end-bar. A split bottom-bar may be used, allowing the foundation to come down and be fastened between the two parts. One part of the bottom-bar is nailed on when the frame is made, the other after the foundation is in place. Of course the foundation is cut large enough to reach down to the bottom of the bottom-bar. Then at the middle a small nail driven through both parts of the bottom-bar pinches them together, holding the foundation in place firmly.

Instead of the split bottom-bar, the ordinary single bottom-bar may be used. In that case the foundation must be cut to make a close fit at the bottom, and melted wax must be run along the edge of the foundation to fasten it to the bottom-bar. Even if the split bottom-bar be used, it is better to use the melted wax so as to prevent the bees from starting to gnaw. The only object of the split bar is greater convenience in making a fit at the bottom, for with it there is no need to be exact about cutting the bottom of the foundation. After the work is done, the single bar is just as good as the split bar—perhaps better.

To drive the moisture out of the splints and to fill their pores with wax, throw them into wax boiling hot. They will froth up with the air and steam driven out of the splints. When all frothing ceases, take them out of the wax and keep them stirred as they rapidly cool, so they will not be stuck together.

When ready to press the splints in place, the frame with foundation is put on a board the same as for wiring, the board being large enough to fit rather loosely inside the frame, with stops on the edges of the board to allow the foundation to be in the middle of the frame. A heavy black mark is made on the board at the place where each splint is to be laid, the black mark showing through the foundation. The mark will show more plainly if the board be painted white, or if white paper be pasted upon it.

In a brood-frame of usual length a splint is placed at each end about $1\frac{1}{2}$ inches from the end-bar, and another in the middle of the frame. Then, if medium brood foundation is used, a splint is placed midway between each end-splint and the splint at the center. But if light brood foundation is used, two splints will be used in place of each one of the last two splints, the space being equally divided. Thus it will be seen that for medium foundation there will be five splints with spaces between them of about $3\frac{1}{2}$ inches; and for light foundation seven splints with spaces between them of about $2\frac{1}{2}$ inches.

A few splints are thrown into a shallow dish of wax kept only hot enough to be liquid (if boiling hot the splints will melt their way through the foundation), and one by one each splint is lifted with a pair of pliers and laid in place, while a helper presses each splint into the foundation by means of a little board with an edge $\frac{1}{4}$ to $\frac{3}{8}$ inch thick, this edge being kept wet.

Another way that is possibly better, but has not been so thoroughly tried, is this: Instead of using a pair of pliers pick up the splint with the fingers, holding it by one end; dip it into the hot wax as far as possible without touching the wax with the fingers, and then lay it in place, putting next the top bar the dry end, which is held in the fingers. The upper end may not be so well imbedded as if dipped in the wax; but bees are not much inclined to gnaw at the upper end. In this way there is less harm from having the wax very hot, and one can handle the splints more rapidly with the fingers than with the pliers.

For ordinary brood-frames there is no object in having wiring when splints are used. With frames of unusual depth there is a possibility of the foundation bellying out to one side, so it may be well to have a single horizontal wire drawn taut midway between top and bottom, or else two wires some three inches apart, the wire being imbedded before the splints are put in. For extracting-frames, there will be less dan-

ger of combs breaking out in the extractor while they are new if wiring be added, if, indeed, it be thought advisable to use splints at all in extracting-frames.

It is important to keep in mind that bees have a strong inclination to have a passageway between the lower part of the comb and the bottom-bar. If a frame of splinted foundation be given when bees are doing little or nothing, the bees will be pretty sure to dig away this passageway, using the wax gnawed out to help in the upper part of the frame. So such frames should be given to the bees to be drawn out only at a time when honey is yielding well. In an upper story the bees do not care so much to make this passageway.

C. C. MILLER.

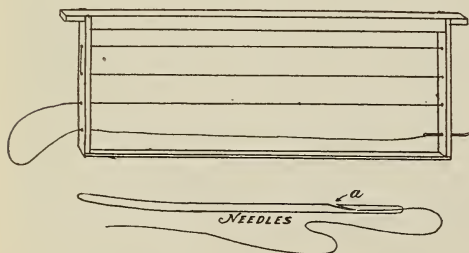
THE METCALFE FRAME-WIRING NEEDLE.

Some Hints about Wiring Frames.

BY O. B. METCALFE ("THE N. M. CHAP").

Having several thousand brood-frames to put together and wire last spring I set about getting up some contrivances to aid in the work. The accompanying cut shows my needle for wiring frames. The tip end of the wire is drawn tightly into the small slot shown at *a*, where it wedges in so tightly that it may be pulled in two before it will slip out. The needle automatically grips the wire at the very end, and so that the wire may be drawn by the needle itself.

When the wire has been threaded through all the holes, the very tip end of it may be tightly wrapped four or five times about the last nail by simply holding the wire just inside the frame firmly with the left hand, while with the right the needle is twisted round and round the partly driven nail, the wire being forced to feed out through the slot as it wraps around the nail. As soon as one gets well on to the trick, the end of the wire will be wound so closely up to the nail as to leave no trace of it after the nail is driven up. The operator does not get his fingers pricked while doing it, and nothing is left to prick fingers in the future.



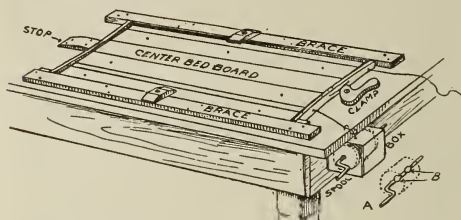
I made some of these needles last season, and gave them to my neighbor bee-keepers. They reported that they were such a boon to them that they could not get along without one, and I know I shall never wire as many as fifty frames without one, even if I have to stop and make it.

Some credit is due my partner, H. L. Parks, for perfecting this needle. I at first made the slot right at the end of the needle; and after sticking the doubled-back end of the wire in his fingers a few times he suggested that I make the slot further up the needle so about a quarter-inch of wire could be turned

back without extending past the needle. The suggestion was a good one, and, so far as I can see, perfected the needle.

A FRAME-HOLDER FOR CONVENIENCE IN WIRING.

Next in order of contrivances I made a frame-holder for holding the brood-frames while wiring them. Any one may make one of these by a study of the illustration.



The small wooden eccentric, when it is turned toward the frame, will crowd the frame against the small block opposite, and the end-bars will be slightly sprung in. If I remember correctly, I read this plan of springing in the end-bars in *GLEANINGS*; at any rate, it is not original but worth repeating; for it leaves the wires tightened better than any other method.

Make the small wooden box just a little larger than necessary to hold a spool of wire. Put the spool in it and bore through the sides of the box with a small bit so the bit will pass through the hole in the spool and on out the other side of the box. Next get a small iron rod of a size to go loosely through the hole in the spool, and about 14 inches long. At two points, about 2 inches apart on the rod and about 2½ inches from the end, mash it with a hammer until it will not quite go into the spool. File the edges of the flattened places sharp. Put a spool of wire in the box, and force the flattened places through the hole in one side of the box, and far enough into the spool so the end of the rod will pass out the hole in the opposite side of the box. Bend the remainder of the rod to a right angle twice, making a small crank. Nail the box under the table so the wire will feed out just right to enter the hole at the top of the right-hand end-bar, and so the little crank will be handy to turn with the right hand. Drive a staple in the edge of the table for the wire to pass up through, and you are ready to wire frames.

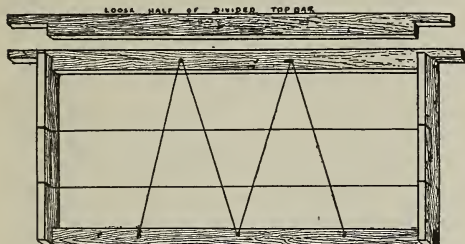
When the wire has been passed through all the holes and fastened to the nail, and the nail driven up, as is usually done, take hold of the little crank and begin to wind, helping the slack along with the left hand. When the wires seem well stretched, catch the wire just outside the frame, and, holding it tight, let go the crank; wrap the wire four times about the nail driven for that purpose; drive the nail up well, and again go through the same motion you did to wrap the wire around the nail. This twisting will break the wire off close under the nail head, and you will have a well-wired frame with no sharp ends to stick fingers in the future.

Mesilla Park, N. M.

HEADS OF GRAIN FROM DIFFERENT FIELDS

A FRAME WITH A TOP-BAR IN TWO PIECES.

For quite a number of years I have been using a frame of my own invention, which I think beats any thing on the market for ease of wiring, fastening



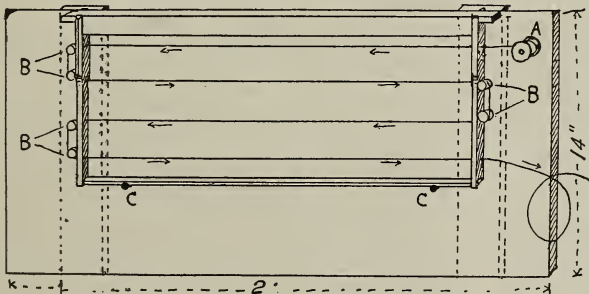
foundation, and especially for replacing damaged combs of foundation. The top-bar is in two pieces, the loose piece being nailed to the other after the foundation is put in place. I formerly nailed the end-bars also to this loose piece; but for replacing damaged combs, etc., I find it more convenient, and just as strong, if the end-bars are not nailed to the movable piece. The double wiring, as in the illustration, shows how easily and quickly either horizontal or vertical wiring may be done.

Pittsfield, N. Y.

GEO. A. HUMPERT.

PREVENTING THE WIRE FROM CUTTING INTO THE END-BARS.

Wire is somewhat springy; and as soon as a short length is removed from the spool it forms loops. The loops are liable to make kinks, and these break when the wire is drawn tight. When the end on the spool is released, the wire promptly unwinds enough so that



several dozen turns drop off the lower end of the spool because of this same springiness or elasticity. Once off the spool, the tangle begins.

Drawing the wire through the frames also has its difficulty, as the wire cuts into the wood of the end pieces where it turns the corner to go from one hole to another. A roller at the end of each span of wire just outside the end pieces, and tangent to a line drawn through the holes, was the apparent remedy; but while reflecting on how to make the rollers I remembered how easily the wire slides around a broom handle which I had used for straightening short bent pieces of wire, and found this a good substitute for rollers, when arranged on a board as shown in the attached plan.

The board is 2 feet long and 13 inches wide, underneath which are fastened two three-inch cleats which serve to stiffen the board and hold the pegs firmly. The pegs are of maple, and project $1\frac{1}{2}$ inches above the surface of the board. The two rows are 17 inches apart, and the pegs are shaved off on the inside so as to hold the frame more firmly. A three-inch nail is used for a spindle for the spool, and four one-inch finishing nails, driven in the lower flange of the spool, keep the wire from dropping off and catching on the spindle. A three-inch disk of tin, nailed on the lower

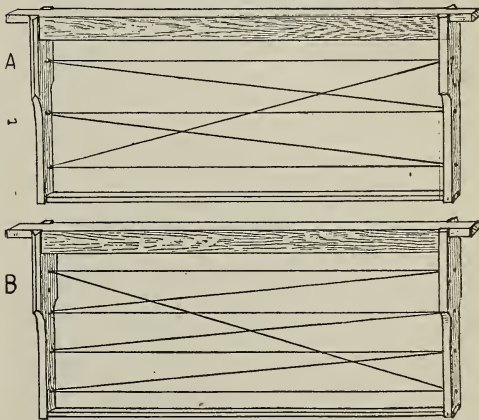
end of the spool, might serve the same purpose. After the wire is drawn through the frame and the end is made fast, the frame is lifted from the board, slipping the wires from the pegs, when the spans can be tightened and the wire made fast at the end next the spool and then cut off without waste.

Elyria, Ohio.

W. J. M.

NAILS BENT IN THE FORM OF HOOKS INSTEAD OF HOLES IN THE END-BARS.

Nearly every one runs the wire through the end-bars. This is surely a laborious manner in which to get the wire in the frame. I simply drive three slender nails through each bar, and with round-nosed pliers turn up the points on which to hook the wire. This makes five wires in the center, where the most sagging occurs. The wires must be drawn tight. If left slack, of course the foundation will sag. You will observe that the wires are too close together for the foundation to buckle. If not close enough, use four



nails instead of three. I hear some say that this is too slow—takes too much time and labor. I will venture this assertion: I can drive and bend the nails, run the wire on the hooks, fasten the foundation with melted wax and brush, twice as fast as I can by running the wire through three or four holes in each end-bar; the imbedding of the wires, only a trifle more. The wire from top to bottom hook is for a brace or stay to overcome the tendency of the other two or three diagonal wires drawing the frame out of square. With this the frame is held rigidly square by using a brace in the frame when drawing the wires. It takes but little more wire than the usual way. None is lost running up and down the end-bars. All is in use, and no foundation will sag or buckle if the wires are tight.

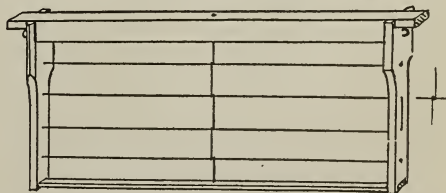
Corona, Cal.

H. M. JAMESON.

[See answer to C. Pennock on next page.—ED.]

HORIZONTAL WIRES SUPPORTED BY ONE VERTICAL WIRE.

My combs are perfect. There is no sagging of the foundation or bottom-bar, and no drone-cells. I punch



a hole in the center of the top and bottom bar; run a wire through; fasten wire with nail the same as horizontal wires are fastened; give one turn around each horizontal wire, then run it through the bottom-bar;

draw fairly tight (if too tight it is liable to cut the wires); then fasten. It does not bother when putting in the foundation.

Bellevue, Colorado.

CHAS. E. PENNOCK.

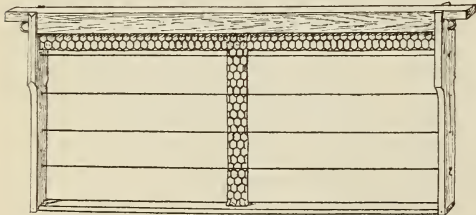
[Some years ago we tried various schemes of cross-wiring. We finally settled on what was known as the Keeney, which is a good deal the same as that shown and described by H. M. Jameson on the previous page. The difficulty with all intersecting wiring is the tendency of the foundation to bulge or buckle in the triangles formed between the wires. At the precise point where the wires intersect, there will be no sagging; but as the foundation is drawn out, the portion above the intersection has a tendency to bulge, and the result is a slightly uneven comb surface.

The best scheme of wiring is a series of vertical wires without intersections; but with ordinarily thick top-bars this does not seem to be feasible, especially with those who use the wedge-and-groove plan. We finally adopted the four horizontal wires—the wires being threaded through the end-bars. This form of wiring only partially overcomes the sagging of the foundation while it is being drawn out into comb. The portion one inch down from the top-bar (if light-brood foundation is used) is liable to have elongated cells. These will be filled with honey, while the portion below will be filled with brood that will have normal-sized cells.

Dr. C. C. Miller, to overcome this, put in vertical splints. Under some conditions, and with some bee-keepers, the plan leaves nothing to be desired. Under other conditions it does not quite fill the bill.

We have had in mind for some time back a scheme, for incorporating wires in foundation after it is run through the rolls, the wires being inserted on a vertical line. This plan will still necessitate wiring the frames as now, as no scheme of putting wire in the foundation at the factory will answer unless those same wires can be secured to the top and bottom bars of the frames; and no Yankee or other genius thus far knows how to do this without making the cost too great. When running extracting-yards it is very important to have the wires secured permanently to the frame. A scheme of wiring that merely prevents stretching or sagging of the foundation is a long way from being satisfactory. Years ago we tried running wires in along with the sheet of wax as it went through the foundation-mill. Mr. E. B. Weed worked on this problem for some time, but gave it up in disgust. While it may work with flat-bottom foundation, no feasible plan has yet been presented to make it work on *natural-base* foundation. But if there is any demand for vertical wires in ordinary brood foundation the article can be supplied. In this case the wires would be incorporated by means of electricity *after* the foundation has been run through the rolls.—ED.]

I ran short of foundation when I needed it most, so I economized by putting a vertical strip one inch wide in the middle of each frame, and also used the one-



inch starter at the top. My frames were already wired, so I imbedded the wire where the vertical strip of foundation crossed it as shown in the diagram.

The bees built straight firm comb in the frames so treated, and I was unable to tell those frames from those in which I had used full sheets at extracting time.

Of course, I do not claim there would be any thing saved by this plan in the long run, for no doubt I might have had more honey by using full sheets.

Colegrove, Pa.

R. A. WILLSON.

[This plan is perfectly feasible under some conditions and some seasons of the year; but in many cases one would get a large amount of drone comb.—ED.]

BRIEF REPORT OF THE MICHIGAN STATE CONVENTION.

After the secretary made his report a discussion was opened on membership fees, whether it was policy to

remain in affiliation with the National, etc. It was pointed out that the extra 50 cts. which was paid to the National could be used to good advantage in pushing the work of increasing the membership of the Michigan Association, and also in better advertising the booklet which has been a direct means of selling the members' honey. On the other hand, it was advanced that we should stay by the National in order to get the benefit of its protection in legal matters, and also on general principles. It was finally decided to remain as before; but an extra assessment of 50 cts. per member was levied for the Michigan, which virtually placed the membership in the Michigan at \$1.00 a year with an extra 50 cts. to go to the National. This gives the members membership in both. Another important action was in having the membership in the Michigan expire Jan. 1 each year.

The question of wiring frames to prevent sagging came up as a result of a paper prepared by General Manager N. E. France, of the National. Some lively discussion followed. The result was that the Association agreed that, no matter how one wires, there will be sagging as long as the foundation is made as now, with the cells running parallel with the top-bar. The following resolution was passed: "Be it resolved by the Michigan bee-keepers in convention assembled, that the manufacturers of comb foundation be asked to consider the question of making brood foundation so it will hang just opposite the way it is now made, the object being to prevent sagging."

The marketing of honey by cooperative methods came up for some lively and interesting discussions. During the past six years the association has been publishing a booklet giving the names of its members, and statistics regarding the amount of honey produced, and this has been a great help in finding markets. This year it was advertised in three bee-journals, and as a result it was sent all over the United States. One bee-keeper who produces at least 10,000 lbs. of honey annually, stated that he could sell ten times as much as he can produce, and gives the credit to the booklet. This year there will be 1500 published, and they will be even more widely distributed than before. This will probably be the extent of the cooperative efforts in selling this year, excepting information which will be given the members by the executive board regarding supply and condition of markets. Another year, however, may see an advance along this line.

The program as formerly published in the bee-journals was carried out, the papers of those not present being read by the secretary. Visitors from outside the State were Geo. W. York, of the *American Bee Journal*, and L. W. Boyden, of The A. I. Root Co. Mr. York read a paper entitled "Honey, its Marketing and Staple Use." Mr. Boyden contributed some valuable suggestions on the advertising of honey, among them being demonstrations at pure-food shows.

The former officers were reelected, remaining as follows: President, L. A. Aspinwall, Jackson; Vice-President, E. D. Townsend, Remus; Secretary-Treasurer, E. B. Tyrrell, 230 Woodland Ave., Detroit.

The next convention will be held in Grand Rapids.

Prizes were awarded as follows on the exhibits made: Best 10 lbs. of comb honey, first, C. S. Foote, of Ridgeway; second, L. C. Wheeler, Barryton. Best 10 lbs. of extracted, first, A. D. D. Wood, Lansing; second, L. C. Wheeler: 3 lbs. of extracted containing least water, first, L. C. Wheeler; second, A. D. D. Wood. Best 10 lbs. beeswax, first, A. D. D. Wood; second, J. H. Peters, Detroit; third, L. C. Wheeler.

Hon. Geo. E. Hilton will represent the association at the State Legislature in reference to any foul-brood legislation, and the executive board will appoint a representative to meet with the National at its next meeting.

Detroit, Mich.

E. B. TYRRELL, Sec.

HOW TO REQUEEN IN EARLY SPRING.

What would you advise a beginner to do when he finds one of his colonies queenless in early spring? Omega, Okla., March 14.

N. D. DICKEY.

[In almost every case you will find that there will be one or more other weak colonies in the yard having a queen. If any colony, strong or weak, is queenless, unite it with one of these colonies having a queen. If it is a little early in the spring we would advise putting two colonies together, placing them in the cellar and keeping them there for about a week, and then set them out permanently on their summer stand. But we would place such colony on the stand occupied by the stronger of the two, because some bees will return to their old stand. These can be collected in an empty hive having a dry comb, and placed where they belong.—ED.]

A REPORT FROM ONE WHO USES AN AUTOMOBILE IN OUT-APIARY WORK.

I was pleased to read and note what you have said in GLEANINGS on automobiles. I have been impressed with the idea that the automobile is what the outyard man wants, so that I could not rest until I succeeded in finding one that I could buy, about the beginning of September last, and which has fully demonstrated the advantages looked for. When I have taken a team to a yard 20 miles away it has taken all day; but when I took the Runabout I had eight hours to work, "or more if wanted." I took my exhibit to and from our county fair, including a new demonstration cage.

We simply run the machine under a large apple-tree, jump off, and go to work. Well, I thought that that machine ought to be credited with my extra three or four hours' time that morning, and also with half the expense of a team. I value it at \$200. I have carried five hives of bees as well as other things, and I consider there is nothing their equal for carrying bees. Ease and quickness are what are required for that. I think I can do about double the amount of peddling honey in a given time with it over the old way.

My machine is only seven-horse power. I want one about sixteen-horse power, and more room for carrying supplies or bees.

I shall look forward with much interest to what you will have to say about them from time to time. Perhaps you could get up such a machine. I should think you could sell any number of them, as they would be just what the farmer as well as the bee-keeper needs, for it looks to me as if it would practically bring the farmer 40 per cent nearer market.

Manistee, Mich., Feb. 20.

WALTER HARMER.

SWEET CLOVER COMING TO BE RECOGNIZED BY THE AGRICULTURAL PAPERS.

I am making considerable headway with sweet clover in my State. One year ago no farm journal would tolerate the idea of advocating the sowing of *Melilotus alba*; but now, if you read *Wallace's Farmer* you will notice that they advise farmers to sow it under certain conditions, saying it should be taken on trial by all farmers. It begins to look now as though *M. alba* were to play a prominent part on every farm in the United States, both where alfalfa is grown and where red and alsike are depended on.

Much good has come from Henry A. Wallace's visit to my field last fall, and that is why he recommends its use as a pasture-plant, and the coming summer I hope to demonstrate its value as a superior hay crop, just as I have done as a superior pasture legume.

THE YELLOW VARIETY PROMISES WELL.

I am harboring a strong hope that the yellow variety may prove to be of great value to sow in the corn at the last plowing, and then to be pastured the following season or be plowed under the last half of May. If this proves to be good it will mean more to the corn-belt farmer than any thing of the kind that was ever brought to light. That is why I want this yellow seed. Yellow sweet clover grows two feet high here by the 16th of May, and could be turned under; and what a fertilizer it would make, and all in time to plant to corn! or if sown with timothy it would make a splendid pasture; or knock down the stalks, and with a binder cut it for seed. It is a proven fact that sweet clover is the best to feed to stock, and that it contains more of the essentials than any other clover. Doesn't the future look bright for sweet clover?

Maquoketa, Ia., Feb. 7.

FRANK COVERDALE.

IS IT TRUE THAT WINTERING AND BREEDING UP IN THE SPRING ARE WEAK POINTS IN SECTIONAL HIVES?

I am glad I read Bro. Holtermann's report of the Chicago Northwestern convention, p. 45. Here I've been keeping bees in sectional hives right by the side of other kinds of hives for a quarter of a century, and do not know yet that wintering and breeding up in the spring are weak points in these hives.

Regarding the decision by voters of the convention as to what constitutes an eight-frame or a twelve-frame hive, I feel sure that, upon a more mature deliberation, the decision would be reversed by the same jury, for no one can deny that when a super is temporarily used as a brood-chamber over an eight-frame hive it becomes for the time being a sectional hive of 12-Langstroth-frame capacity with all the advantages of a sectional hive, which advantages should be apparent to every thinking bee-keeper.

Where is the economy in having a fixed twelve-frame brood-chamber for the bees to shiver in all win-

ter and spring when they would be so snug and comfortable in an eight-frame body? Why not make them of twelve-frame capacity when that capacity is needed (during the breeding season), by adding a super? Birmingham, O. J. E. HAND.

NUMBER OF COLONIES NEEDED TO SECURE CROSS-POLLINATION OF FRUIT.

We should like to know if you have any data giving the number of stands of bees necessary to insure pollination of fruit-trees in orchards. We should like this estimate based on acreage. We know this is a subject that is very hard to arrive at any definite conclusion on; but we should be interested in having any report you could make us.

PORTLAND SEED COMPANY.

Portland, Oregon, March 9.

[There is no absolutely accurate data giving the number of stands of bees necessary to insure pollination of fruit-trees in orchards. Progressive fruit-growers, however, are asking to have bee-keepers put in their orchards somewhere about ten or a dozen colonies each. If the orchards are very large, such as are in California, Colorado, or possibly in Oregon, a much larger number would be required. We would rather err on the side of having too many than too few bees. No trouble has been experienced where there are as many as 100 colonies to one small orchard, that is to say, that number does not seem to overdo it. Whether a dozen colonies in the same orchard would do the work just as well, we can not say.—ED.]

SWARMING OUT AFTER SHAKING ON FOUNDATION.

On page 81, Feb. 1, Mr. Percy Orton says, "Don't shake bees on to foundation alone, as over half will swarm out." I shook fifteen colonies on to foundation and but one swarmed out, that one having less than a quart of bees. I could hardly blame them. This is not "ancient history" but modern, having occurred last season. I shook them in the evening after dark, giving them all night to think it over. Perhaps that makes a difference; who knows?

Canon City, Col., Feb. 9.

W. G. WRIGHT.

[If bees are shaken off on to foundation during the middle of the day, say from 10 to 2 o'clock, there is some danger, especially during the swarming season, that they will swarm out. If they are shaken out at or toward night, they will cool off by morning, and probably by that time be ready to start housekeeping anew.

Years ago, when we shook on to foundation to cure foul brood in our yard, we always shook toward night, or just as it was getting dark. We treated in this way in all something like 80 colonies. There was not one of them that swarmed out, so far as we now remember; and the bees went to work the next morning building the foundation into comb.—ED.]

DO FIELD PEAS YIELD HONEY?

I write to know if bees gather honey from the common varieties of field peas. Last spring was very unfavorable. It rained three to four times a week, and the bees did not gather any honey; but in August we had several fields of peas in bloom, and the bees worked on them all day. Whether they were gathering pollen or honey I don't know.

Calhoun, Ga.

BOYLE DILLARD.

[Our impression is that common field peas do under some conditions yield honey. They belong to the same general family as the locusts; and there is no reason, when conditions are right, why they should not yield some nectar. If any one has any evidence to offer we shall be pleased to hear from him.—ED.]

A HONEY-BANQUET.

A year ago at the State fair we organized the Shawnee Co. Bee-keepers' Association, and now we have 30 members. This winter we met with the Kansas State Bee-keepers' Association, and we had a good time. I think if every county could have a county association for home encouragement, and then send a delegate to the State association it would encourage the industry and be a great help to all bee-keepers. Of course, here in Kansas the bee industry is new; but it is fast coming to the front, and Kansas is bound to be a grand bee State, as there is much alfalfa raised here. At the close of the meeting we had a honey-banquet. Everthing was made with honey, and honey in all forms was on the table. We had an observation hive with bees in it for a center piece, and everybody went home well pleased and happy.

Topeka, Kan.

J. P. LUCAS.

SPRING FEEDING BY PLACING COMBS OF HONEY IN THE HIVE.

After studying what has been written about spring feeding I should like to try a plan recommended by Mr. Gray, of England, in *GLEANINGS* for 1908, p. 1200. He advises placing a frame of honey in the center of the brood-nest about the first of May, and then, fourteen days later, giving them two other frames; and after other fourteen days, two more. I should like to hear from any one in this country who has tried Mr. Gray's plan and can tell how it works.

TWO COLONIES IN ONE HIVE.

I have a few colonies of bees in the cellar that are weak. When they fly in the spring I intend to put two colonies into one hive with a division-board between them. The division can be made of veneer tacked to top and bottom cleats. This arrangement will conserve the warmth.

Ridgewood, N. J.

WM. LEITCH.

[England has a much milder climate than most sections in the Northern States. Putting a comb of honey in the center of the brood-nest by May 1 might be too much of a good thing. In many localities it would be far better to put the comb of honey *at the side* of the brood-nest by May 1. Later on it might do to put it in the center. Before a brood-nest is tampered with very much there should be settled warm weather.—ED.]

SKUNKS KNOCKING ON THE HIVES.

I have been experiencing considerable difficulty in keeping the triangular entrance-blocks in place. I had the same trouble during previous winters, but worse this one. I could not believe they had been worked away by the wind so frequently, for on many occasions I had found them displaced when I knew it had been comparatively quiet. I became suspicious that chickens, rats, or some other animal was responsible, and was on the point of setting a trap. Last night, about nine o'clock, my wife discovered something knocking at one of the hives. This hive rests on pieces of brick about two inches from the ground. It was covered with a light box for shade. Stealing quietly to the hive I listened for some time to the drumming, which was as regular as any bee-keeper ever produced. I finally discovered that the drumming was beneath the hive. By stooping I could discern the animal by the bright moonlight, and every little while it would poke out its head. A lantern and a rifle were brought, and with the added light of the lantern the drumming still continued. The animal would pause and stick out its head, and I took advantage of this exposure and gave it a ball. I do not know how it could have produced this drumming, unless with its head. The bees did not seem much disturbed. They had probably been drummed in this manner so frequently that they were used to it. I suppose the purpose was to cause the bees to fill themselves with honey and then attract them to the entrance by scratching, where they could be caught.

Geary, Okla., Jan. 28.

N. F. GARDINER.

[Skunks may have learned the trick of bumping on hives to draw the bees out at the entrance. Say! you didn't tell what happened after you shot the skunk. We have been informed that, unless the shot instantly kills or paralyzes, the animal will scent up the neighborhood. We infer that you made a good shot.—ED.]

HULLED SWEET-CLOVER SEED SETS AS QUICKLY AS ALFALFA, ALSIKE, ETC.; THE HULLED REQUIRES SIX MONTHS.

The articles in *GLEANINGS* on the subject of sweet clover are very interesting. I bought a few pounds of The A. I. Root Co. in the fall of 1909. The yellow was hulled, the white was unhulled. I sowed both varieties in September. The yellow hulled seed came up in ten days, but the white showed no life. On page 828, June 15, 1907, J. A. Green says the white hulled seed came up very promptly, while the yellow unhulled came up best the following spring. I think our combined experience shows that hulled sweet clover seed of either variety will germinate just as quickly as alfalfa, alsike, or any of the clover family, while the unhulled seed requires six months, or time to rot the hull before it comes up, thereby removing the ban that has been following sweet clover—that is, that it invariably takes six months to germinate.

As clover honey granulates quite readily the apiarist is fortunate if he lives where gallberry (holly), mountain sage, or snowdrop grows. The snowdrop grows on the open hills or in dense forest growth in my lo-

cality. It is a fine-growing shrub, never over four feet high, with a small pink bell-shaped flower that produces an abundance of water-white honey in June. The seed is produced in white berries that hang on all winter. I have a bottle of this honey mixed with clover three years old that has frozen repeatedly, and has just commenced to granulate.

Fraser, Idaho, Feb. 16.

F. F. GEORGE.

A LEGAL CONTROL OF BEE TERRITORY WOULD BE UNCONSTITUTIONAL.

Referring to the article on page 41, Jan. 15, about the control of bee territory, I can not see why a bee-keeper should claim exclusive right to any territory any more than a person engaged in any other business. Has a physician or a lawyer an exclusive right to any territory, to the exclusion of others in the same profession who may choose to enter that locality to try to make a living? Even though the meat or grocery business of a certain place is overdone, who shall claim that no one else has any right to start in the same business there? Because a certain dairy can supply all the milk demanded by a certain community, does that fact forbid any one else starting a dairy if he so desires? If the bee-keepers of Imperial Valley have formed a "trust" to keep out all intruders, how are they any better than the Standard Oil Co.? Do not their methods savor somewhat of those of the Western Federation of Miners? So far as legislation to give any bee-keeper control of certain territory is concerned, I think it would be unconstitutional from the very bottom, and contrary to the rights of every free citizen. I regard bee-keeping as similar to any other business. The man who starts it does so to make it pay, ordinarily, and I can not see why laws should be passed to protect him especially against any one else who might wish to engage in that business in the same locality, any more than that laws should be passed to give a blacksmith control of all the territory within a given number of miles from his shop, to the exclusion of all other prospective blacksmiths. Dr. Miller says there is no conflict about a cow-pasture, and asks why there should be about a bee-pasture. I grant the first part. As a rule the owner of the cows owns the pasture also; but suppose those cows had wings and could fly all over the country, feeding where they like. I fear that then there would soon be trouble. In the same way, if the owner of an apiary owned all the land within the limits of the bees' flight there would be no cause for trouble; but such a condition is almost unheard of, and the bees must pilfer from many landholders.

I do not in any way favor the Australian system unless the payment is made to the owners of the bee-pasture. What right, moral or otherwise, has a State or county to collect revenue by granting to one person the privilege of allowing his bees to steal nectar from the flowers belonging to others, and forbidding such owners to keep bees to gather the nectar from their own fields and orchards?

A man may plant a great fruit-orchard or tract of alfalfa, and establish a few hives of bees for insuring fertilization. Along comes Mr. Special Privilege, bee-keeper, and says, "Here! you must not keep bees, for I have bought the right for this locality."

"But," says the orchardist, "it is my land, my orchard, and therefore I consider it my honey if my bees gather it."

"No," says the other, "you must give the honey to my bees, for I have bought the privilege, and you would be interfering with my business."

What sort of justice is that, to compel a man to give the nectar from his orchards and other flowers to some "protected" bee-keeper? Dr. Miller's comparison of stock-raising and bee-keeping will scarcely stand; for not much stock is allowed to range wholly free as are bees, but in most cases it is kept within certain definite limits.

Fort Casey, Wash., Feb. 17.

ERLE SARGENT.

QUESTIONS ON BEE DISEASES.

I have received lesson 13. Please send me lesson 14, and at the same time answer the following questions:

1. By "spring dwindling" do you mean the act of bees flying out too early and chilling, never to return again, or dying from old age without leaving the hive?
2. What is sorghum syrup?
3. By curing paralysis does O. O. Poppleton sprinkle the sulphur on the bees and combs dry, or does he mix it with water?
4. Where can I find any information in regard to queen cramps?

5. Under "bee paralysis" you say, "Destroy the queen of an affected colony." Now, does the germ of paralysis affect the blood or vital bacteria of the brood or not? If not, why destroy the queen? By what germ is the paralytic contagion spread (in what manner)? If the queen is destroyed, would you advise requeening from a new strain?

6. Please give a little more detail in general, and state the symptoms of chilled brood, overheated brood, poisoned brood, starved brood. In any of these three cases, will the bees remove the carcass of the larva or does this have to be done by the apiarist? In how many of the above cases does the brood die?

7. Does spraying poison ever kill adult bees?

8. Will the dead mass of American rosy foul brood invariably rope?

9. Will the color sometimes vary outside of the coffee-brown tints described?

10. Do the cells containing dead larvæ invariably sink as soon as life departs from the grub, or how long after? Does the capping fall first and then the grub die?

11. About how long after the disease affects the first portion of comb does the odor make itself noticed?

12. Is the rosy test a base symptom, or, so to speak, a *dead-sure sign* of American foul brood, or does this symptom *have to go hand in hand* with the others in order to prove the case?

13. How can you manage bees at night? I tried it once, and they stuck to every thing and could not be made to go in at the entrance after the hive was closed, clustering in front all night. Could not a tent be placed over the hive at night, and the manipulation carried through next morning?

14. By the McEvoy method are the bees left to go and come after they have been brushed for the first time on a starter? If so, why would not the robbers take the disease-tainted honey just stored from the sacks of the brushed colony and thus spread the contagion?

15. Page 138 of the last edition of the A B C and X Y Z of Bee Culture, what can you use honey for that has been extracted from foul-brood combs?

16. Page 138, why do you say, "As soon as brood hatches out of healthy combs extract the honey and melt combs" if the brood hatches? If the brood hatches out healthy, why melt the combs?

17. Page 138, has this ever been proven by experience? How can a colony be cured when the bees have intercourse with the diseased colony and the honey therein?

18. Page 140, is all the brood in the hives taken away and bees shaken on foundation after being dequeened, or do you mean, in other words, no egg-laying is allowed? Are the queens destroyed or put back again after the lapse of time?

Whitstone, L. I.

ADOLPH LOEHR.

[1. "Spring dwindling" is the term used to describe a number of evils. It may be caused by the bees flying out too early, as you say; by dysentery; by too great a mortality, due to too large a number of old bees in the hive in the spring, etc.]

2. Sorghum syrup is a syrup which is glucose in its nature, made from the sorghum, otherwise known as Chinese cane.

3. Mr. Poppleton sprinkles on the dry sulphur instead of mixing it with water and pouring it on.

4. It is not often that a queen has the cramps; but sometimes, if one is picked up that is in the height of laying, and heavy with eggs, and is handled somewhat carelessly, as by an amateur when clipping, for instance, she may turn over, stretch out, and appear to be dead. After a few minutes, however, she usually begins to move a little, and finally is able to walk again.

5. Unfortunately, far too little is known in regard to the disease known as paralysis. This disease is not well named, however, for there are no symptoms like paralysis in the human family. A number of the bees will exhibit a peculiar shaking or tremulous motion as they stagger from the hives. It seems to be a disease of the mature bees rather than of the brood, and it is well known that certain strains of bees are less likely to be diseased in this way than others, and that is why it is a good plan to requeen whenever a colony shows these symptoms. It is not known just what is the way in which the disease spreads—that is, whether it is of germ origin.

6. The symptoms of chilled, overheated, poisoned, or starved brood are almost identical, and even experts are often puzzled by simply examining the brood alone. If the history of the colony can be taken into consideration it is generally possible to decide which is to blame—whether chilling, overheating, poisoning, etc. In the spring, if the combs contain no honey and

there is dead brood, it is quite reasonable to suppose that the brood starved, although, of course, if very cold weather occurs during the early spring, and the bees have more brood than they can cover, it is likely that the trouble was due to chilling. Overheating is not very common, but does sometimes occur during the very hottest weather when there is no ventilation through a proper-sized entrance, and when the sun shines directly on the hive. Poisoned brood would not be likely to be found in one colony and not in others unless it were known that this one colony worked on blossoms that had been sprayed, while others did not. With the advice that is going out now from all the experiment stations, practically, there is less and less blossom-spraying being done; consequently, there are fewer reports every year of poisoned brood.

A strong colony will almost always remove larvæ that have died from any cause except those that have died from American foul brood, and, of course, this is such a sticky mass that they find it impossible unless the colony is very strong with a large force of young Italian bees. Brood is likely to die from any of the above causes.

7. The spraying-liquids of poisonous nature often kill adult bees. Cases are on record where almost whole apiaries have been destroyed. For instance, Metcalfe & Parks, of Mesilla Park, New Mexico, have lost very heavily in this way.

8. The roping is the characteristic symptom of American foul brood, and we do not believe that there are any cases of this disease where the dead larvæ do not rope at all—at least we never heard of such.

9. The color of the dead brood is not a distinctive symptom, for dead brood of any kind is likely to turn various shades of yellow, brown, black, etc. There is really not very much difference in the color of dead brood, no matter what may be the cause of the trouble. In the case of a rosy type of foul brood the color turns darker as the disease progresses.

10. The cappings sink after the larvæ die. The cappings of larvæ that have just died are perfectly normal in appearance.

11. The odor from American foul brood varies according to the case. In some instances it is hardly perceptible, while in others it is so strong as to be noticeable when one enters the apiary. It usually depends upon the length of time the disease has been running; but we think it may be quite noticeable in some cases where the disease has just started; while, in other cases, where it is more advanced it might not be as strong.

12. It may be pretty safely stated that if the ropiness of the dead brood is very pronounced the disease is almost sure to be American foul brood. However, there is likely to be a slight roping with the European foul brood, although usually not nearly to as great an extent.

13. Handling bees at night is not difficult if the light be placed a little above and back of the hive—that is, the side opposite from the one in front of the operator. There would be no advantage in using the tent the next morning.

14. There is not likely to be much honey stored that is diseased; for the amount in the honey-sacs of the bees, that might be diseased, is used in comb-building; therefore the bees may be allowed to come and go. Robbers would not be likely to rob from brushed or shaken bees. We have never known them to do so.

15. Honey that has been extracted from foul-broody combs may be used on the table. It is not injurious to man. Probably the majority who have honey from foul-broody combs boil it thoroughly and then use it for feeding back. There are some, like Mr. France, who feel that boiled honey is dangerous. Disease has sometimes returned when boiled foul-broody honey was given back to bees.

16. There may be some disease in the combs described, even though much of the brood would be healthy; and since it is impossible to clean up a comb diseased with American foul brood, there is nothing to do but melt it up. It is better to err on the safe side.

17. In this case the bees should be brushed again on foundation, after the brood above has hatched and the upper diseased combs removed. You will notice that the directions given here are to treat as before described; that is, go through with the process again of shaking on to new foundation.

18. The brood does not need to be removed in the Alexander treatment, for that which is in the hive already is allowed to develop. You will probably prefer to read the Alexander treatment as it was originally given by Mr. Alexander, and so we refer you to Nov. 1st GLEANINGS, 1905. The queens in this case are usually destroyed; at least, different queens should be introduced and the best Italian stock used.—ED.]

OUR HOMES

By A. I. Root

In all thy ways acknowledge him, and he shall direct thy paths.—PROV. 3:6.

It is now the 15th of March, and I have made my last hatch with my two incubators before going to my northern home. A good many inquiries are coming in in regard to that "simplicity" incubator pictured and described in our issue for Dec. 1. By the way, perhaps I should mention that I have not only taxed my brains but I have done more praying (that the Lord would "direct my paths") in regard to this incubator, than any other thing for some time. While all along I have had glimpses of success, I have reason to fear it was unwise to describe it as I did while it was yet unproven. I did it a good deal as I have done all my life, to set other minds at work on the problems that are confronting me; and, judging from the correspondence, I have succeeded pretty well.

I have already mentioned getting one hatch, from a machine full of eggs, of about 70 per cent; but when a neighbor, Mr. G. M. Raub, a York State bee-keeper who has recently passed his 80th birthday, on his first trial with a new incubator secured over *eighty per cent* (and has every chicken alive now), I began to think I and my incubator are a "back number." I think friend Raub got the chicken fever by coming down to visit me. As he had no previous knowledge with incubators I advised a sitting hen; but hens were too slow, and he made a trip to Tampa and came home with a "Mandy Lee" machine (the one I advised him to get*) almost before I knew it. I called to advise him; but the new moisture hygrometer, and, as it seemed to me, the complicated directions, were such that I feared he would never do any thing with it. He sold 12 of the chicks to a neighbor of his, and gave the rest (close on to 70) to a single sitting hen, just as I have been advising, and I think every chick is "alive and well." Full of enthusiasm he filled the machine again (I think before it cooled off), and did almost as well, and now he is running the *third* hatch. I have the credit of furnishing him the eggs, or at least the greater part of them.

There is a big moral right here, friends, for old people like Mr. Raub and myself. Is there any thing nicer and more fitting for elderly people who want to be busy about something than caring for chickens? Such a one can, with a clear conscience, ask God to "direct his paths" in devising and planning for this innocent and harmless rural industry. Friend Raub lost his good wife but a short time ago, and so he is alone in his neat little cottage, surrounded by a very pretty Florida garden. He has his bright new incubator close by his bedside, and I

can easily imagine it is a sort of company for him while he enjoys studying it and giving it the careful attention it requires.

Well, we have another neighbor, Mr. Daniel Abbott, who, with an old Prairie State incubator that had remained unused for several years, took 187 chicks from 214 eggs. I furnished the greater part of the eggs for this remarkable hatch also. Well, after I heard of this and saw the fine healthy chickens, I tackled my Cyphers incubator, and, by closely following *all* the directions, I secured almost an 80 per-cent hatch, and every chick is now alive—yes, very *much* alive—as I see them out of the window from where I write; and this brings me to the point of my story to-day.

Five days after starting the seventy-egg Cyphers I gave the old Simplicity 60 eggs for one more trial. In order to make out the 60 of fresh-laid eggs I took three eggs from a hen that had been sitting on them just about 24 hours, and I put a pencil-mark ring around each one of the three eggs. By means of a new thermometer called the "Inovo," that I got of the Prairie State people, I kept the temperature of the *eggs themselves* much more accurate than ever before, and in just 19 days two bright strong chicks hopped out of two of the pencil-marked eggs so quickly I didn't even know they were pipped; and you will recall that the eggs are moved from every shelf to the lower one every eight hours. This shifting three times a day is all the "cooling" and turning the eggs get; and examination on the 18th day with my egg-tester showed nearly sixty eggs with a live active chick in every egg. I noticed then these two eggs were plainly in advance of the others. Well, heretofore I have practiced shifting the eggs from shelf to shelf until all were hatched; but as Cyphers and others plainly declare the eggs are not to be touched or moved at all after the 18th day, I decided *this* time to stop moving, even if each egg is warmed only from one side by "contact heat," as has been already explained. At this time there were eggs on four shelves (see p. 740, Dec. 1), 14 on each of the three lower ones, and 11 on the upper shelf. Now, this upper shelf is not as warm as the three lower ones, and it is the one I always use to place the chicks just out of the shell, so it was desirable to get these *eleven* eggs out of the way; and, therefore, I warmed up the Cyphers machine again just to take those eleven eggs. Now mark carefully. One reason for the eight-hour shifting is *because* this top shelf is colder, and the eleven eggs that happened to be on it that particular morning were exactly like (and, in fact, a part of) the whole 57 fertile eggs. Well, *on the 21st day all of the eleven but one had produced a fine chicken, and that one was partly hatched.* If every egg from that upper shelf had produced a good chick why should not all of the other shelves? I was almost ready to shout to the boys back in old Medina that my incubator had given a 100-per-cent hatch; but Mrs. Root held up her finger and said, "Counting chickens!"

*At that time this was the only incubator I knew of for sale in Tampa; but since then the Cyphers people have also opened a house there. See advertisements of both, also Prairie State, in this issue.

This is a bad place to stop, I know; but I think I must digress a little right here. Cyphers and other incubator manufacturers are very emphatic in saying you must not open the incubator to help chicks out of the shell, etc. They say, "On the 18th day shut up all ventilators *tight*, and don't open the door until the hatch is over." Over against this advice the folks on the "baby-chick farms" open the machines any time to get chicks that are dry enough to fill orders, etc.; and Philo's "trick of the trade" is by *helping* chicks to break the shell, etc. Who is right?

This is what I did: I reasoned that, if Cyphers' machine was so much better after the 18th day, I would open the door and put *another* shelfful in. I reasoned it could not hurt those already out and mostly dry, and the one almost out could stand it, and so I made the transfer. At this time, besides the two chicks on the 19th day, only about half a dozen were hatched in my incubator, and almost *at once*, so it seemed, every chick in both incubators "died in the shell."^{*} The one that was part way out stopped work when that door was opened; and, although the temperature was kept right up, and the door was open only a second or two, he never made any more progress until I removed the shell after the hatch was all over.^{*} Some of you may think all this a trivial matter, but in it I see two glimpses of God's wonderful laws and traces of his handiwork. First, what did that sitting hen *do* to those eggs during the 24 hours she had them that gave them the "send off" so they went through my clumsy machine and gave those two bright chicks so promptly?

The editor of one of the poultry-journals said it was of great importance that the temperature be pretty exact for the first week, but that it didn't matter so much about variations during the latter part. In connection with this it may be well to mention *again*, that, after a hen has been on eggs for about a week, they may be out of the nest as long as *three days and two nights*, at a temperature of 50 degrees or lower, and *still* give a good hatch of healthy chicks. Over and over again I find people throwing eggs away because the hen deserted them and they "got cold."

Well, my experiment, or, if you choose, *experience*, calls out two questions: First, if my 57 eggs had all been under a hen 24 hours (like the two) would I have had a good hatch?

Second, if I had shifted the whole 57 (instead of just the 11 on the top shelf) into the Cyphers machine, where there was plenty of room for all, would all or nearly all have hatched as did the 11? Even if I have not as yet had a really successful hatch with the "simplicity," have I not come pretty near

^{*}As the whole incubator cellar was close to 80, I don't think you can say I *chilled* the eggs by opening up, etc.

^{*}After it seemed likely no more eggs were going to hatch, I placed them all on a looking-glass, as I have explained, and only two "wobbled" to indicate life. These two I helped out of the shell, but will hardly make a "live" of it.

it? I am now satisfied a thermostat to control the temperature would be a decided advantage, for, in fact, just before I removed the 11 the heat went up one night so I feared all were injured; but as *these* hatched so finely I was forced to conclude none of them were harmed.

There is another beautiful text in line with the one at the head of my talk to-day. "But the path of the just is as the shining light that shineth more and more unto the perfect day."—Prov. 4:18. Now, suppose we change the word "just" to the words "honest, unselfish investigator" (and I think we have a right to do this), and see what a grand incentive we have to push on. My "pathway," both in bees and poultry, has been blessed all along by additional "light," pointing continually to the more "perfect day" ahead; and I will close by giving one more of my recent "discoveries." You will recall how many have decided that the fireless brooder needs a little heat for the first few days unless the weather is very warm. Well, after reading on page 166 how friend Clough kept full-grown hens in his lampless brooder to get eggs in winter it occurred to me a *sitting hen* could be put into this brooder for a week or ten days, and she would be cheaper and better than any lamp. Well, when I recently took 55 chicks from my Cyphers machine, I had a hen with eight half blood Buttercups only a few days old. I raised the upper part of the brooder up to the highest notch, and, toward night, induced the hen to go in with her chicks with very little coaxing, and *then* induced the 55, just as they came out of the incubator, to run into the brooder about as you would run a swarm of bees into a hive. I made a little dooryard of netting around the brooder for the first few days, but now she goes everywhere with her "swarm" of chicks, and hasn't lost one. As they are close to the highway they are a delight to the eyes of passersby, old and young. Say, now—what's the matter with my "lampless brooder"?

HOW TO MAKE AN EGG-TESTER; AN EXPLORING EXPEDITION INSIDE OF AN EGG-SHELL.

I have visited Yellowstone Park, Mammoth Cave, Niagara Falls, and have enjoyed them all; but I am not sure but that the tracery of God's handiwork in an egg-shell during incubation has not given as much keen enjoyment as any or all the others. The only conditions are a good egg-tester and a place to use it. The card below has suggested my topic.

Friend Root:—I notice in your poultry articles you speak of an egg-tester of your own invention. As I am a new subscriber, and there are probably others, could you not give a description of it in the next issue of your poultry article? You have my sincere sympathy in your loss of chicks by "varmints." I have had the same experience; but steel traps and good cats have banished them from the place. I hope you will have better success with the next lot.

Loda, Ill., Feb. 4.

WM. RIDEOUT.

The invention is not mine, but belongs to Mr. R. R. Root, of the Root Incubator Co., Cleveland, Ohio. Get a cheap pasteboard

box about 6x8x3½ inches. Mine is a box that contained "toasted cornflakes," by the Quaker Oats Co. Remove the top, and with a sharp penknife cut the sides so it will fit close around your face. Make the right curve where it strikes your forehead, and then the opposite side where it goes around your nose. The idea is to make a little "dark room" around both your eyes. All the testers I see figured in the catalogs are for one eye only; but I find it a very great advantage to be able to look with both eyes as you do with a stereoscope. Now cut a hole in the opposite end or what is usually called the bottom of the box, a little larger than a good-sized egg. Cover this with a piece of black cloth, soft leather, or, perhaps, better still, a thin piece of soft black rubber. Fasten this fabric over the hole with tacks or glue, but so you have it tight and close. Now cut a hole in the center of this rubber, about as large as a common spectacle-glass, and your machine is done. If made carefully, every streak or ray of light should be cut off around the egg when held against the opening, and also when the box comes up around the eyes. If you use spectacles you want strong magnifying power to see clearly 6 or 7 inches from the eye. Now with this you can quickly test fertility, even out of doors, and fairly well on a cloudy day; but to see what is going on inside the egg every day you want a darkened room, with a single ray of sunlight coming in about the size of an egg. Stay in the room, as I have before explained, until your eye is accustomed to the darkness; and then when this single ray falls on the egg opposite your eye you are able to see not only the machinery of unfolding chick life, but you can also see the antics of the chick before he escapes the ivory walls of his prison house. A day or two before exclusion these "antics" will cause the egg to move slightly when placed on a smooth cut-glass mirror. This is what I have termed "animated eggs."

NOT ONLY AN EGG-TESTER, BUT A SEX-TESTER.

I presume many of you have seen accounts in the papers of a machine that would tell sex, etc. I have passed it by heretofore as too ridiculous to be considered by any intelligent reader; but it seems the fellow has had the cheek to carry his "toy" to one of the poultry shows; but a reader of GLEANINGS was too much for him. Read the following:

At the recent poultry show at Madison Square Garden, New York city, among the novelties there was a "sure thing" egg-tester, the invention of W. Gunnerson, of No. 20 Garden St., New Rochelle, N. Y. The inventor claimed that his device would not only tell an unfertile egg from a fertile one, but would also determine the sex. The device was a small pendulum which was held over the egg to be tested. If it swung around in a circle it indicated a cockerel; if back and forth in a straight line, a pullet; and if it remained stationary, an unfertile egg. I devised a plan to test the machine; and, accompanied by Frank Rodgers, of *Farm and Poultry Magazine*, brought an egg for Mr. G. to test. The device was placed over the egg and commenced to whirl around in a circle. Mr. G. pronounced it a very fertile egg, and, if placed in an incubator for 21 days, it would hatch out a cockerel, and he would bet \$100 on it. I then took the egg, and, in

the presence of about fifty people, broke the shell and stated that it was a hard-boiled egg, and showed it to the spectators. Mr. G. said he did not care—there was life in it any way. The joke of the boiled egg spread all over the Garden, and next morning Mr. G. was kept busy testing eggs which, on breaking, all proved to be boiled, and the management then took a hand in the game and ousted Mr. Gunnerson from the Garden. The price of this marvel was the small sum of \$2.50. Yonkers, N. Y. WALTER C. MORRIS.

ST. CLOUD, BURBANK, OCALA, ETC.

In view of the many inquiries that are still coming concerning the Florida land-advertising schemes, we have thought best to give place to the following from the *Rural New-Yorker* of March 10:

You stated the exact truth when you said the lands of the St. Cloud Veteran Colony, of Florida, were almost worthless and almost uninhabitable. These land schemes requiring money to be sent in advance, and the land allotted by the promoters, always prove disastrous. The promoters work for their own interest; and to send them money is little less than idiosyncrasy. Any one seriously meditating such a course may well be watched by his friends and put under guardianship before he has a chance to consummate the deal. Though no mention is made of irrigation, drainage, and fertilization, these are very important items. An acre of land in Florida irrigated and fertilized for one year will cost the purchaser from \$300 to \$400 on an average. I have not seen an acre of land to be relied upon to produce a crop without from \$60 to \$80 worth of fertilizer, unless it be some of the muck land which does not require quite so much. If several crops are raised on the same ground, each one must have additional fertilization. And the market is very uncertain. I could tell you some distressing cases in connection with this colony. One man came all the way from Washington State only to find that the promoters had deceived him. M. C. L. St. Petersburg, Fla.

It seems too bad to have to give so much space to one scheme. We have referred to it often; but when schemers take advantage of the sentiments of old soldiers, and, through pretended interest and comradeship, deceive them, and rob them for personal gain, one feels justified in any honest effort to block the game. Do not send money to any land promoters anywhere. If you want to buy in any section, first investigate yourself or through trusted friends.

I am credibly informed that some of these "promoters" buy up blocks of land for, say, \$2.50 per acre, or even less, and then persuade their victims, they are getting a great bargain at all the way from \$10.00 to \$30.00 or \$40.00 per acre. Florida is a good place if you come, see what you are buying, and talk with people who have lived here for years.

THE "PROHIBITION LANDSLIDE" IN MISSOURI.

Mr. A. I. Root.—You will be glad to learn that Jasper Co., Mo., went dry by a handsome majority (excepting the city of Joplin), in the recent fight against the saloons. As a result of this election (closing yesterday) 28 saloons must cease doing business as soon as their present licenses expire, which will vary from one to about six months. The prohibition people are not going to stop at this; no, we are going to have a dry State; then we shall get Joplin, a very wicked city of about 60,000 population and some 40 saloons.

Jasper County's greatest resources are the lead and zinc mines. These mines employ lots of men, and they are nearly all whisky men; therefore we are very much elated over the prohibition landslide that has swept over Jasper Co. despite vigorous efforts of active opposition.

Oronogo, Mo., Feb. 5.

HOWARD PETEFISH.

On page 97, Feb. 15, it is asked, "Does alsike or white clover cause bloating in cattle?" I think not unless left till it gets large before pasturing; neither will red clover. Cattle that are very hungry should not be turned on to such pasture more than about one hour the first time, and that after the dew is off. I was raised in Hardin Co., Ohio, and had some experience with the bloating of cattle. After they get used to it there will be no danger of bloating.

◀ Cowden, Ill.

A. W. SPRACKLEN.